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THE SOLDIER'S HEART.*

BY

SIR JAMES MACKENZIE, M.D., F.R.S.,

LECTURER ON CARDIAC RESEARCH AT THE LONDON HOSPITAL.

THAT the trying life of soldiers, exposed to many and varied vicissitudes, should put a strain upon the heart is what we all recognize. This strain inevitably finds out the impaired hearts, whether the impairment gives rise to physical signs of lesions or not. This is well understood, and, in treatment, presents no feature which has not been recognized in civil life, and about this class of case I do not intend to say anything.

These cases, however, form but a small percentage of the cases that are actually invalided on account of their hearts. It has long been recognized, particularly since the instructive account published by physicians during and after the American Civil War, that there is a form of heart trouble to which soldiers are particularly liable, and which has gone under the name of the "soldier's heart" or the "irritable heart of soldiers."

Shortly after the outbreak of this war soldiers invalided on account of heart trouble began to appear in my consulting-room. These were few at first, but as time went on they came in increasing numbers, and I took great pains to find out the circumstances and signs connected with their complaints. These observations brought to light what seemed to me the main cause of the illness which affected the soldiers, so that when I was asked to take charge of the inquiry into disorders of the heart for the medical history of the war, I had before me an object which would give our researches a very profitable aim.

In this work I have been associated with Dr. Wilson, and we have examined about 400 cases. In at least 90 per cent. of the cases that have been certified and treated as heart affections we find that they are not primarily heart cases, and that the principles of treatment applicable to these cases are widely different from those who suffer from heart failure.

SIGNS AND SYMPTOMS.

When we see the soldiers in this country invalided because of heart trouble we find a good deal of variation in their appearance and symptoms. The face is often lined and drawn; many are spare and thin with a great vasomotor instability, as shown by the manner in which the peripheral circulation varies, the hands and fingers at times going pale and cold, at other times the fingers are thick and red, and the nose likewise becomes red and even blue with slight exposure to cold. If they have been treated for some months by rest and feeding, some become pale, fat, and scant of breath.

The chief complaint is an absence of the feeling of being well; they often feel out of sorts—"rotten" is a term frequently employed. A sense of fatigue or exhaustion easily induced is common to all. Breathlessness on moderate exertion is frequent, and more infrequent is pain over the region of the heart. The physical signs are variable. The heart's rate is often not increased; in some it is persistently increased, as frequent as 120 per minute. More frequently, at rest the rate may be quite moderate, but exertion, sometimes slight, may produce an undue rapidity, and it is in consequence of this excitability that the term "irritable heart" has been used.

Murmurs, systolic in time and heard in different regions, are frequent, while an increase in size, usually slight, is not uncommon. In a few cases there is a slight oedema of the legs.

The mental condition is somewhat varied. Periods of depression are not infrequent, and the patients are often very irritable. They accept the view that they have something wrong with their hearts and readily yield to all restrictions, and are often content to lie in bed and brood over their woes.

These are the salient features in a great majority of cases, and you will recognize them as common in civil life. We find identical conditions, for instance, in people recovering from an exhausting illness, as typhoid fever or influenza, or after a severe surgical operation. We see all these phenomena well marked in people who are suffering from some infective organism, and we also find them in people who have suffered a long mental and physical strain, particularly with insufficient sleep, as in a daughter who has for long periods nursed an ailing mother.

The recognition of the character of these complaints gives us a guide in seeking for the cause of the exhaustion in these invalided soldiers, and in a great majority of cases we get a history pointing to an illness which preceded their breakdown.

Onset of Symptoms.

The account given of the onset of symptoms is peculiarly instructive. They will say they were in the trenches and felt well and fit until one day they felt seedy and ill, and this continued until they were compelled to seek medical advice, when they were found to have a raised temperature. A few days' relief was obtained, and they returned to their work still feeling far from well, and, after a few weeks of the strenuous life in the trenches, they collapsed, sometimes with loss of consciousness, breathlessness, or even pain.

The story of the onset varies. Sometimes it is an attack of diarrhoea, which persists for a time; sometimes it is after a definite illness, as measles, but most give a history which we can safely surmise as being due to an infection. In a few cases one cannot get such a definite account of the starting of the illness, but many do recognize the gradual onset of the trouble. That is the story of the majority of cases, but there are a number from whom we can get no suspicious history of infection, but where there is an account of a very strenuous life.

To grasp fully how this exhaustion is brought about, we must understand the life in the trenches. The story of some of these soldiers is illuminating. One in December, 1914, suffered from appendicitis, and was operated on. He returned to duty three months after, and, in June, went to the front. Immediately on arrival he went into the trenches and was there a fortnight. Every night was spent in repairing the damaged parapets. They were constantly being shelled. He never slept at night, and occasionally got a few hours' sleep in the day, often being twenty-four hours without sleep. One day a shell exploded in the trench, knocking him partly unconscious. On regaining consciousness he stuck to his work for twenty-four hours, but had to give in, feeling weak and ill with pain over the region of the heart.

Effects of Strain during Infection.

So great is the mental strain and bodily exertion, with sleepless days and nights, while the trenches are frequently bombarded, that one might be disposed to consider that these factors would be sufficient to account for all the symptoms. But we find identical symptoms present in many who have never been to the front, and who have had no excessive bodily or mental strain, but who have suffered from some febrile infection. The majority also, as I have said, give a history of some previous illness, and it is necessary we should recognize the effects of strain or effort complicated by febrile illness. For that purpose I recite to you the following experience:

A young officer was training for a foot race, and every day spent some time running round a track. One day, while doing this, he collapsed, fell, and was picked up partly unconscious. A doctor was summoned, who said he had strained and dilated his heart, and that was the cause of his collapse. I was asked to see him, and, after getting this account, I recognized that a man who had taken a considerable amount of exercise the day before could not possibly suffer from heart failure, so I asked him if he felt quite well before he began to run, and he admitted that he felt rather seedy, but hoped to shake off the feeling with the exercise. The temperature was taken and found to be raised a few degrees, so I had no hesitation in stating that the cause of collapse was the toxic influence of some microbe invasion and that, with the subsidence of the fever and a few days' rest, he would be all right. That is what happened, and he was able to resume his training, and ultimately ran his race in perfect health.

The action of toxins produced in the body by bacterial invasions has not yet been clearly worked out, but so far as I have gone into the matter a clear and distinct group

* A paper read in opening a discussion in the Section of Therapeutics of the Royal Society of Medicine on January 18th.

of illnesses can be attributed to the toxins even when the organisms themselves do little damage. The phenomena I have described as characteristic of the soldier's heart will give you an idea of the point I want to establish—that the condition is one of general exhaustion, and the circulatory symptoms are but parts of a general manifestation. To appreciate this more clearly so that we may separate them from those in which there is an actual lesion of the heart, I will call attention to some striking differences between the symptoms of the poisoned heart and the symptoms of the infected heart (that is, where the organisms have invaded the heart) and of chronic disease of the heart.

1. *From Infected Heart.*—In some cases there may be doubt as to whether the condition may not be due to an infection of the heart itself. It may not be possible to settle the question while there is a rise of temperature, so judgement will have to be deferred until the fever subsides. If the temperature remains raised for a period of weeks, and no source of infection can be found, then the suspicion that there is an affection of the heart becomes strengthened. With the permanent fall of temperature, the heart can usually be assumed to have escaped infection and the abnormal manifestations (increased rate, systolic murmur, and increase in size) may be taken as the reaction of the heart to a toxin, or to the factors that produce a general exhaustion.

2. *From Chronic Heart Disease.* — The first sign of a failing heart affected by some old-standing lesion is invariably a subjective one—due to a distressful sensation arising when some effort is made which the individual used to perform with no distress. By far the most common sensation occasioned in this way is breathlessness, the next most frequent, pain. Both these may be associated with palpitation. These are sensations which everyone recognizes as indications of inefficiency of the heart. In the poisoned heart these are usually not the first signs, though they also appear—the first sign being the sense of exhaustion.

The Sense of Exhaustion.

This sensation is often taken as a sign of cardiac inefficiency, but it owes its causation to a different mechanism.

When people suffering from weakness consequent upon an infection, or after an exhausting illness, attempt to walk on the level until they are conscious of their weakness, the sensation by which they perceive their weakness is one of exhaustion or sometimes of giddiness. If they stop, sit, or lie down the sensation speedily disappears. If they attempt a more violent form of effort, as walking quickly or up a hill, or running upstairs, they may be pulled up by breathlessness or palpitation—sensations provoked by heart weakness. It is to the sense of exhaustion and its allied sensations, giddiness and faintness, that I wish to call attention, because the mechanism of production is different from that producing the sensation in patients with primary heart failure.

In people suffering from some toxic influence the central nervous system is always affected. This is shown by the sense of feeling ill, by depression, and irritability of temper. There is also evidence of vasomotor disturbances, as shown by susceptibility of the peripheral circulation—the hands and feet persistently cold, or made so by excitement. There is a persistent over-action of vasomotor influences, as the sense of chilliness that persists after a cold bath; at other times flushes of heat pass over the body, and warmth may tend to over-filling of the peripheral vessels. This is seen in people who faint when standing in a warm room, or who speedily become exhausted or even faint when exertion is made. In these the blood tends to accumulate in the peripheral veins of the limbs and in the large abdominal veins, with consequent anaemia of the brain. It is because of this anaemia of the brain that the sense of exhaustion and syncope is provoked.

I do not enter here into all the facts which support this explanation of the sense of exhaustion, as many observers beside myself have fully dealt with the subject. My purpose here in drawing attention to it is to emphasize the mechanism of its production and to show that it is produced in a different manner from the signs of cardiac exhaustion—breathlessness, palpitation, and pain.

The Character and Meaning of Cardiac Pain.

Another distinctive feature which is occasionally present is a sense of discomfort, amounting sometimes to pain even of a severe kind, felt over the region of the heart. The pain may be occasionally provoked by exertion, but more frequently it comes on when the individual is at rest. Its occurrence, not in response to effort, is characteristic of pain due to a poisoned heart, for angina pectoris due to disease in the young occurs when effort is made. While not absolutely diagnostic, the occurrence of pain, when this type of patient is at rest, is strongly suggestive of poisoning.

Heart Abnormalities are but a Feature in a General Condition.

Taking into consideration all the facts, it will be found that the condition from which certain of these soldiers suffer, who are usually understood to have acquired a heart affection, is not, properly speaking, cardiac in origin, but is the outcome of an injury to other systems as well as the heart, such as the central nervous system. Even when we find such marked abnormalities as increased rate, systolic murmur, and an increase in the size of the heart, the cause of these signs ought not to be looked upon as disease, but merely as part of the manifestation of general illness. The importance of this point of view will be realized when we consider the treatment.

The Cause of Illness.

While the reason for attributing the majority of these cases to bacterial and toxic influences is so far purely clinical, good grounds can also be found from bacteriological evidence. As, however, bacteriology is outside my province, I will not touch on that evidence further than to point out that I have frequently met with these phenomena in civil life in people in whom the causative organism has been detected.

Here, however, I should like to point out that while the active agent producing these phenomena may be an organism or its toxin, or the products of physical exhaustion, some changes are produced in the economy—in the blood, central nervous system, or heart muscle—which impair the functional activity of these structures. I do not pretend to be able to decide which of these conditions is present, and in any case they do not materially affect the principles of treatment which have been found of value. It is possible, however, that where the illness is due to a microbe, vaccine therapy may be of value; but I am not qualified to speak of this.

Nomenclature.

It is difficult to get a term which will convey clearly what the nature of the trouble is, so I use here the simple one of "general exhaustion."

It is a great misfortune that a custom has arisen that each sick soldier has to be certified as suffering from a definite complaint. Naturally, in the hurry and bustle of the earliest examination, the examining doctor has not the time to make a careful study of each individual. On their immediate breakdown the patients often present features of exhaustion in which the cardiac phenomena stand out most prominently, and the doctor who sees them naturally labels them by these phenomena. It is for this reason, no doubt, that so many of them are invalided on account of "valvular disease of the heart," "disordered action of the heart," or "dilatation."

My description, like my nomenclature, is very general, and as we inquire deeper into the subject we may be able to distinguish separate groups, each with a definite cause.

Treatment.

I have dealt at some length with the diagnosis of these cases, because if we recognize the nature of the illness, then we can readily see on what principles treatment should be based. The lines are those we employ in civil practice. If the patient be the host of some microbe, the treatment should be devoted to increasing his power of resistance. If he be poisoned, treatment should be devoted to the elimination of the poison. Should certain tissues be injured by the invading microbe, or by the toxin or by physical strain, then treatment should be devoted to their healthy renewal.

These indications are practically those which should

guide us in treating individuals after an exhausting illness. We have, however, in addition, to consider the mental condition of the soldier whose experiences have depressed his mental faculties, and who has been told he has some heart trouble. This knowledge always tends to depress, and to make them extremely amenable to that form of treatment that is the worst for them—rest in bed or the avoidance of exertion. If we recognize that such cardiac phenomena as murmurs, increase in size, and variability of rate are but the experiences of an irritated heart, we shall see that too much rest is not beneficial. Every organ benefits by the judicious exercise of its functions, and the heart can also be beneficially stimulated.

The principles of treatment, then, should be devoted to increasing the health of the body as a whole in such a way as to increase the natural resistance to infection, to eliminate toxic influences, and brace up the whole man bodily and mentally. The best way to achieve this is by fresh air and judicious exercise in the fresh air. I need not labour the fresh air idea as it is evident to all, but I want to emphasize the question of exercise.

There is a notion deeply rooted that if there is anything wrong with the heart the patient must be restricted in the amount of effort, and medical men who are themselves afflicted are quite content to lie in bed or move gingerly about.

The line I have adopted with those soldiers who have consulted me is that which I have adopted in civil life. All those I have seen have already been told that their hearts were affected, and this knowledge tended to depress. They often feel miserable, so that there is a mental side to the case, which is aggravated by the supposition that there is something amiss with the heart. This aspect of the case has to be met, and consequently in our treatment this view has to be kept in mind.

When all fever has subsided, or when there is but an occasional rise of temperature, I encourage the patient to get up and go about. I find out the form of outdoor exercise which gives him most pleasure. In my private practice my patients have been officers, so I recommend them to start as soon as possible any form of sport or game which they can get—fishing, riding, shooting, golf, etc.

In recommending such exercise I have two objects in view. The first is the mental condition of the patient, and I need not insist upon the beneficial effects of occupation. The more interesting that is, the more likely is the patient to be taken out of himself. I have referred to the fact that the sense of exhaustion is the predominant symptom in these cases, and that it is probably vasomotor in origin, due to the irritation of the central nervous system. We know that the mental state may play a part in producing exhaustion, for we find that a boring form of exercise will readily produce it, while a form of exercise that is full of interest can be borne for long periods without any exhaustion. Therefore, this out-of-door occupation should be in an attractive form.

In recommending effort, I know it will be said that there is danger in this, just as there was when the soldier was employed in his military duties, particularly when such physical signs as murmurs and dilatation are present. If the true nature of these signs be recognized—that they are but the expression of a temporary enfeeblement of the heart muscle, and that the same measure for restoring a flabby leg muscle applies to a flabby heart muscle—we shall see the importance of exercise judiciously employed. No doubt injudicious exercise may do harm, but there is one precaution of a very simple kind which suffices to prevent any danger, and that is to instruct the patient to indulge in his exercise so long as it gives him pleasure and causes no distress nor discomfort, but to stop or slow down as soon as he experiences the sense of exhaustion, breathlessness, or pain.

This simple and easily comprehended dictum contains in it the whole philosophy of the therapeutics of exercise as applied to the heart, and may be used with safety in all obscure and doubtful conditions of heart weakness.

It will, however, be said that it is all well and good for officers who can afford such means of pleasurable occupation, but what about the private soldier cooped up in the wards? It is for him I wish to prescribe. I used the officer to illustrate the principle so that I may strongly urge that the same principles should be applied to the treatment of the private. If the officer is depressed and makes but slow progress in his comfortable quarters, what of the private soldier in the gloomy wards, meditating on his troubles, or grousing with his fellows, with an occasional joy-ride in a motor-car? I want this argument for congenial exercise to be fully considered, not only for the pleasure of the sick man, but so that the soldier may speedily regain his health and return the sooner to his duties.

I know that already in convalescent camps the aim of interesting occupation with fresh air is being carried out, and I recommend the same principle to be applied in the so-called heart cases. But in these exhaustion may arise too soon for the participation in mechanical occupation, and I would recommend that the same sort of mental stimulus which has been found beneficial in the officer should be employed—that is to say, games. Games absorb the attention and infuse a different spirit from any other kind of employment, and a selection of some games, as bowling, or quoits, or skittles, would add materially to our therapeutic resources.

As a practical outcome of these suggestions, I would recommend that the Government should provide a large hospital for the reception of soldiers who are supposed to be suffering from a heart affection; that these principles of treatment I have detailed should be employed for the recognition of the nature of the complaint, and the principles of treatment here recommended should be carried out.

As soon as signs of improvement are shown, the soldier should begin drilling—at first for a short time each day; and, as improvement goes on, the time increased until he was able to undertake a normal amount. In this way his preparation for fitness would begin early, and he would be rendered fit much sooner than under the present method of treatment.

I would also suggest that this view of the nature of the soldier's heart should be communicated to the medical officers, in order that the diagnosis should be in conformity with the actual condition, and in this way prevent the grievous injury that is done to the sick soldier by implanting in his mind the depressing idea that he suffers from an affection of the heart.

THE IRRITABLE HEART OF SOLDIERS.*

BY

R. McN. WILSON, M.B., CH.B.GLASG.

In the course of my work as assistant to Sir James Mackenzie, in the inquiry conducted for the Medical Research Committee, I have examined upwards of 200 cases of the condition known as "the irritable heart of soldiers." Careful study of these cases has brought me to the same conclusions as those enunciated by Sir James Mackenzie. I have met what I can only regard as a definite clinical picture, sharply defined and differentiated. The cardinal symptoms he has indicated—great exhaustion after effort; breathlessness on slight exertion; a rapid pulse, which becomes much more rapid upon the slightest attempt at action; pain over the precordial region or along the left costal margin; and a vasomotor condition of greater or less stability—have been present in all my series. I have observed also the tendency to attacks of giddiness to which he drew your attention, the nervous symptoms, the generally high blood pressure, and the tendency to persistence of the condition so long as the soldier is kept confined to his bed.

I propose, therefore, to confine myself to a consideration of the history of the condition, and shall include under this heading the various theories regarding causation that have at one time or another been advanced.

In 1864 the British Government appointed a committee to inquire into the heart conditions prevailing in the army. The committee was assembled by Earl De Grey, and consisted of three generals and two doctors. It sat during the years 1864, 1865, 1866, 1867 and 1868, and issued four reports. In the last the question of infantry accoutrements was considered, and a recommendation was made that the

* Read at a meeting of the Section of Therapeutics of the Royal Society of Medicine.

principle of the brace should be adopted. The idea was that the old form of accoutrement restricted the heart's action. The committee described the condition of irritable heart, which it seems to have recognized clearly as "an extreme excitability of the heart, combined with some, but not great, enlargement. During rest a heart of this kind beats easily, but on the least exertion its action becomes irregular, and the man becomes breathless." The recommendation of the committee regarding the change of accoutrement was later on adopted.

The American Civil War meanwhile was furnishing a large number of cases of "soldier's heart," and in 1864 Henry Harthorne published a paper in the *American Journal of Medical Science* which, I venture to say, furnishes an exact picture of the condition as Sir James Mackenzie has described it to-day. Dr. Harthorne laid stress on the rapidity of the pulse, on the acceleration of the heart's movements on the slightest exertion, on the shortness of breath, and on the cardiac muscular weakness. He suggested that in the soldier the heart was injuriously affected by long-continued over-exertion with deficiency of rest and often of nourishment, and he pointed out that several months of rest and treatment in hospital failed to do more than improve without really curing a large proportion of well-marked cases.

Two causes had thus been suggested so far back as 1864—tight accoutrements and over-exertion. The tight accoutrements were done away with, but the irritable heart remained. I pass over here the contribution to the subject made by Dr. Arthur Myers, of the Coldstream Guards, in 1870, because his description is similar to that already given, and because he also regarded accoutrements as the exciting cause of the trouble. But I must call attention specially to the paper of Da Costa published in 1871 in the *American Journal of Medical Science*. It is the best known contribution to the subject. Da Costa saw upwards of 300 cases in a hospital in Philadelphia, and he affords the following striking picture:

> A man, three months or so on active service, was seized with diarrhoea, annoying yet not severe, soon rejoined, and then noticed that he could not bear exertion as well as formerly. Out of breath and unable to keep up with his comrades; dizziness and palpitation; accoutrements oppressed him, yet otherwise he seemed well and healthy. Sought advice; was sent to hospital, where his persistent quick heart confirmed his story. Digestive disturbances, if present, passed away, but the irritable condition of the heart remained, and only very slowly did this get normal or it failed to do so.

Da Costa then proceeded to paint the same picture as that which has been shown to-day by Sir James Mackenzie. He mentioned, however, that he had noted that intercurrent attacks of fever caused the pulse to become less and not more irritable, and to slow down while the attacks lasted.

In 1876 a new phase of the subject was presented when, the change in form of accoutrement having failed signally to effect any improvement, Surgeon Arthur Davy suggested that what he called "setting up" drill was the cause. His theory was ingenious. Setting-up drill, he said, by over-expanding the chest, caused dilatation of the heart and so induced irritability. This view found support in 1880 from Brigade-Surgeon Veale, and again in 1896 from Surgeon-Captain J. B. Wilson, but the discontinuance of setting-up drill does not seem to have put an end to the condition. On the contrary, I have met it in cases in which this cause could be absolutely excluded, the patients having undergone little or no drill.

The theorists, therefore, are bankrupt; the disease remains. More recently we have been asked to view it from the bacteriological standpoint, and more recently still as a condition depending upon faulty action or excessive action of the thyroid gland. I am not in a position to discuss these views, but it is interesting to note in this latter connexion that I have observed that in some eighteen of my cases the thyroid gland was definitely enlarged, and that administration of thyroid extract seemed to exacerbate the symptoms. The application of *x* rays to the thyroid gland is said to have effected improvement in some cases. Let me say, however, that I have seen cases presenting very much the same clinical picture in which the administration of *x* rays did not help matters at all.

In view of the dangers which have attended the making of theories to explain this disease in the past, I am strongly of opinion that we must preserve an open mind. There would appear to be but one sound method in regard to the condition—the method of prolonged observation and continuous study. Many tempting views suggest themselves, but few stand the test of further investigation.

On the other hand, a few facts seem to have emerged. One of these is that a cheerful atmosphere confers benefit, and a depressing atmosphere exaggerates the condition. The patients are always better when their minds are enlisted in some more or less congenial occupation.

A NOTE ON CERTAIN OF THE VASCULAR PHENOMENA OF CARDIAC DISEASE.

BY

BASIL PARSONS-SMITH, M.D.

THAT considerable importance should invariably be attached to a complete investigation of the blood vessels in all cases of heart disease has long been maintained, and, particularly from the point of view of prognosis, with obvious advantage, for the circulatory mechanism, in its dual constitution of heart and blood vessels, needs a careful and complete study if anything approaching accuracy in the forecast is to be obtained.

Whilst, therefore, every cardiac case that comes before us must undergo a minute examination of the heart itself, its size, rhythm, sounds, etc., our responsibilities do not stop there: we must go further and undertake a rather more generalized study of each particular patient, inquire into the condition of the kidneys and their excretive powers, form some opinion as to the condition of the arterial walls, estimate the blood pressure and pulse tension, and glean additional information from various of the graphic tracings taken from the large superficial vessels, from electrocardiographic records, and by the method of direct vessel auscultation.

The strides which have been made in these latter methods during the past few years are very extensive and widespread in their application; they render possible a diagnostic accuracy hitherto unknown, at the same time facilitating treatment and firmly establishing it upon a sound scientific basis.

With regard more especially to the particular physical signs evinced by the vessels a mass of interesting data is forthcoming; for the purposes of the present communication it is proposed shortly to consider the great venous and arterial channels at the root of the neck and detail a selection of the causes which warrant their very careful study.

In the first place we may conveniently discuss the value of simple inspection, and by so doing formulate a working comparison between the healthy subject and the victim of disease. Reference to the former need but be brief, for the normal neck presents remarkably few noteworthy features; careful inspection discloses results of a singularly negative character; arterial pulsation cannot be made out, and it is only on looking carefully that one can appreciate some slight amount of venous movement, either produced by the external jugular vein, which pursues a superficial course for the majority of its length—in fact, to the root of the neck, where, immediately above the mid-clavicular point, it perforates the deep fascia to join the subclavian vein—or by the internal jugular vein, which, lying rather more deeply in the neck on the outer side of the common carotid artery, may be noticed to visibly pulsate, especially if the overlying sterno-mastoid muscle be relaxed. While, however, this slight amount of venous pulsation may be perfectly obvious in the healthy subject, we must clearly realize that it is by no means a *sine quâ non*, for one frequently notices that it is entirely absent, and unable to be appreciated by naked-eye observation, especially in those normal adults who are possessed of necks nicely proportioned and free from hollows. It seems, therefore, from the foregoing that one must accept both slight venous pulsation and its complete absence as conforming entirely to the healthy state of the normal adult, and, as a general rule, it may be taken that the amount of subcutaneous fatty tissue is the determining factor in every case.

Following inspection one must proceed a step further and endeavour to become conversant with any auscultatory

phenomena which may be normally recognizable at the root of the neck. This question is one which can readily be proved to offer little difficulty: the second aortic sound is clearly heard when one listens over the common carotid artery, also the first sound, which, though perfectly definite, is less well conducted than the former; both sounds, moreover, are better heard on the right side than on the left, as one would naturally expect from anatomical considerations, and both undoubtedly suffer some diminution in intensity by reason of the fact that they invariably mingle to some extent, not only with the respiratory murmur, but also with the venous hum which can so often be detected, especially if the venous channels be large. It is, however, possible, by using gentle pressure, to compress the veins sufficiently to abolish this bruit, but great care must be taken, for if the pressure be excessive the arterial lumen will also be diminished, and a bruit in the artery itself will thereby be produced.

These few remarks explain sufficiently what one must expect, and provide for us a clear mental picture of the characteristics peculiar to health, so that there can be no difficulty in recognizing the various and significant changes which manifest themselves coincidently with the onset of cardiac disturbances.

That the comparison is striking and self-evident one needs but call to mind the clinical picture which valvular disorders so often present late in their history: the jugular veins, overcharged with blood, stand out in prominent fashion, and over them passes a swift wave-like rippling movement, the visible indication of the state of affairs in the auricular chamber.

This venous pulsation is very frequently of value from the point of view of diagnosis, for its types are many and varied. To mention but a selection will suffice:

(*a*) The extremely irregular rhythm of auricular fibrillation.

(*b*) The break of an otherwise regular rhythm by the incidence of premature beats; of the latter, possibly the most evident are those originating in the atrio-ventricular region.

(*c*) The flickering undulation of high velocity which characterizes the paroxysms of true tachycardia and auricular flutter.

(*d*) The differing venous and arterial rates of auriculo-ventricular block, several auricular beats being recorded for every one of the ventricle, a physical sign which renders ordinary heart-block diagnosable by means of inspection alone.

One moment's consideration, therefore, will prove that venous pulsation at the root of the neck is by no means a rare phenomenon, being present in health to a slight degree, and in cardiac disorders frequently. Naturally, the extent of the pulsation and the particular amount of venous distension are variable factors and significant at times of widely differing conditions. More often than not a forcible deep inspiration will temporarily empty the distended veins, but there are conditions in which no such effect can possibly be produced, as, for instance, (*a*) pericardial effusion, if the amount of fluid be sufficient to effectively obstruct the onflow of venous blood to the heart; (*b*) adherent pericardium, the extreme fibrosis accompanying which spreads slowly and by degrees round the great vessels, tending in time partially to strangle these latter, an effect much exaggerated by deep inspiration; (*c*) aortic aneurysm, in which the venous overfilling assumes a more permanent quality, tends to be rather more prominent on one side than the other, and extends over a very wide area, possibly including the side of the face, the arm, and the chest wall in varying amounts; (*d*) new growth, probably a more frequent cause of permanent venous distension than any other.[2]

Such considerations, therefore, outline the importance attaching to over-distension of the veins. Equally important, however, is the other side of this picture, which, shortly expressed, may be taken to indicate a myocardial failure, the muscle being too weak to maintain even a small amount of venous plethora. This particular branch of the subject has been ably referred to by Stacey Wilson in certain of his recent lectures. He lays special stress upon the signs of heart weakness in later life, when the actual volume of circulating blood is cut down, the area of cardiac dullness is diminished, the loudness of sounds and murmurs is lessened, the supraclavicular hollows are empty, and the cervical veins are maintained in a state of permanent collapse. Signs such as these, therefore, are the expressions of an enfeebled myocardium, whose mechanical powers have become curtailed to such an extent that a physiological rearrangement has become necessary—namely, an actual decrease in the amount of circulating blood, and a general vascular emptiness; memorable phenomena, in that they are so unlike the physical signs met with in cases of cardiac failure, where, in spite of a general venous distension, hepatic engorgement, oedema, etc., the cardiac muscle continues to contract in vigorous fashion, possessing, as often it does, abnormal powers of resistance.

THE ARTERIAL PHYSICAL SIGNS.

Under this heading it is proposed shortly to consider the diagnostic help which may be acquired by a careful inquiry into the conduct of the large arterial trunks at the root of the neck.

The carotid vessels, whose beat can be accurately located by palpation on a line drawn from the inner end of the clavicle to a point midway between the angle of the jaw and the mastoid process, are sufficiently deeply placed under fascial and muscular coverings that, under all ordinary circumstances, no pulsation is visible. With the presence, however, of certain diseases, notably aortic regurgitation, profound anaemia, exophthalmic goitre, etc., this obviously does not apply; one has only to call to mind an ordinary case of aortic disease to remember at once the intense pulsation visible in the neck in such a case, and, further, that the pulsation is of a peculiarly collapsing quality, an ill-sustained wave, especially in the later stages of the disease, so much so that one is persuaded to adopt as a general working hypothesis the fact that the greater the amount of collapse present the greater the amount of regurgitation, and necessarily the greater the progress of the malady. This, however, does not apply to those cases in which the aortic stem and large arteries have become rigid with disease and possibly there may be a progressive stenosis superadded to the original disease; such changes would obviously militate against an excessive pulsation.

This latter subject—namely, exaggerated arterial pulsation—should under no circumstances be dismissed without remembering a fact which seems very self-evident, but which is none the less important—that, when present in consequence of an aortic lesion, it constitutes a bilateral feature, in contradistinction with its one-sided appearance in aneurysm of the carotid artery and also when on one side the normal carotid artery is displaced forwards by some such agent as a neoplasm which causes the vessel to take up a more superficial position. The differential diagnosis between these conditions offers no difficulty when one remembers the generalized implication of the vessels in the one instance and the purely localized signs in the others.

Proceeding next to direct vascular auscultation, and remembering that the heart sounds, both first and second, may be heard quite clearly in the arteries of the neck under normal conditions of health, it does not seem in the least surprising that murmurs may also, at times, become evident. First, the true systolic murmur, which, possibly, of all murmurs is the most readily conducted towards the periphery. This murmur may be produced in one of two ways—either by a true aortic stenosis, or by an aortic dilatation causing a condition of virtual valvular stenosis, with possibly the presence of rigid, rough valves; and with the first of these conditions, the seldom seen true stenosis of the aortic orifice, one hears a rough systolic murmur on auscultating the carotid or subclavian artery in the neck, a marked diminution in the loudness of the second sound, and palpation reveals the conduction of the systolic thrill into the same vessels. The second condition—namely, aortic dilatation with valvular roughening—also yields a loud systolic murmur with upward conduction; but in this case there is no thrill and the aortic sound is accentuated in loudness.

Deserving, moreover, of some attention in the present context are the upwardly conducted murmurs which result from some one of the large variety of congenital lesions —such, for instance, as (1) the murmur produced by pulmonary stenosis, which, resembling the pulmonary

dilatation murmur of anaemia, suffers conduction into the cervical vessels on the left side but not on the right; (2) the murmur of congenital aortic stenosis, and (3) the murmur of pulmonary stenosis, which, complicated as often it is by the patency of a ductus arteriosus, is conducted by the agency of the latter into the systemic vessels, and therefore can be heard clearly in the carotid arteries on both sides.

These considerations concerning the upwardly conducted systolic murmur, with brief reference to the arterial murmurs in exophthalmic goitre and anaemia, lead to an examination of the murmurs which are found in the diastolic interval. It will suffice for this present purpose if we make short mention of the murmur and some of the physical signs associated with incompetence at the aortic orifice.[1] In the writer's opinion, apart from a very natural study of the amount of dilatation present, and also the progress of the sclerotic changes in the heart and vessels in each particular case, one may form a very reasonable estimate of the progress of the malady by a careful investigation of the murmur itself and its routes of conduction. In the early stage one hears the typical murmur following the second sound, and seemingly preventing the valves closing with the usual snap; this murmur is conducted down the sternum apexwards, and auscultation in the neck reveals only the normal heart sounds, possibly the second being somewhat weakened. Stage II arrives with a conduction of the murmur into the vessels —the well known murmur of Duroziez, the first and second sounds being, however, still faintly heard. Stage III differs only from Stage II in that the murmur is more distinct in carotids and the second sound can no longer be detected. This departure of the second sound from the carotid, by preference the right carotid, where one is out of reach of the pulmonary sound, always marks a serious advance of the disease, as does the advent of Stage IV, when one is only able to hear a loud murmur in the vessels, possibly even the double aortic (bellows murmur), by reason of some certain amount of added sclerosis producing a narrowing of the aortic orifice, and the heart sounds are quite inaudible.

It seems valuable, therefore, to listen especially for the normal second aortic sound in the neck in patients with aortic incompetence; also to ascertain if the murmur is conducted into the vessels, its relative loudness in this situation and at the aortic cartilage, and to base one's prognosis upon the results of such an investigation, combined with the ordinarily careful physical examination.

The Venous Physical Signs.

Under this heading we may range a varied and interesting group, the several members of which not only afford valuable comparison with the state of affairs normally obtaining at the root of the neck, but assume an importance equal in every respect to that attaching to the arterial physical signs just enumerated. Visible venous pulsation, so insignificant in the healthy, becomes with disease a striking feature, and may assume, broadly speaking, one of two great varieties—either the positive or the negative type. By these terms one distinguishes the pulsation observed in a vein which is filled during systole —as, for instance, when, with an incompetent tricuspid valve, every contraction of the ventricle reflects, quite unopposed, a wave into the proximal veins—from the opposite type, the negative pulsation, so called because, with the systolic phase, there is a definite venous emptying. As a rule it is quite impossible to differentiate these pulse variations by inspection alone, and, as we shall see later, one can only form an accurate diagnosis if aided by some instrumental method—either a graphic record of the excursions of the vein wall, such as can readily be furnished by any ordinary polygraphic machine, or by the more recently devised method of Parkinson,[3] who photographs directly the venous pulsation by seating the patient so that the neck is placed directly in the beam of light from an electrocardiograph. By this proceeding one overcomes the disadvantage which sometimes attaches to records obtained by the tambour process—namely, the instrumental delay and possible overswing—and, in addition, one can simultaneously record the electrocardiogram, thus, for timing purposes, producing a combined tracing of the greatest possible value.

Naturally, however, one cannot invariably obtain these venous pulse records. There are at times difficulties, as, for instance, with the excessive arterial pulsation of aortic disease, when the venous pulse is quite obscured; also at times of respiratory distress, when, all the accessory muscles of respiration being brought into play, it becomes quite out of the question to attempt any form of tracing at the root of the neck, and in the extreme venous emptiness which is known not only to result from severe heart weakness but also to accompany certain types of adherent pericardium, though in this latter condition one more usually finds a universal venous engorgement, somewhat approaching the condition observed in cases of aneurysm and pericarditis with effusion. These two diseases, however, are somewhat distinct, in that with them venous distension is quite continuous, not disappearing even when a deep inspiration is taken. Moreover, with the presence of pericardial adhesions, the fullness or emptiness respectively of the great veins being determined by the actual position and consistence of the adhesions themselves, one usually finds that the veins are also permanently distended and cannot be emptied, even by a forced inspiration. There is, however, another frequently occurring lesion which participates in the production of venous distension; it is tricuspid incompetence, and the progress of this particular valvular mischief may be very fairly judged by carefully examining the great venous channels connected with the right auricle. For our present purpose we may take the jugular vein and investigate, by the graphic method, the different stages which characterize the condition; its early course, as portrayed by means of ordinary phlebographic tracings, presents no features of note; in fact, the record appears normal. Fig. 1 is an example, and, taken from a

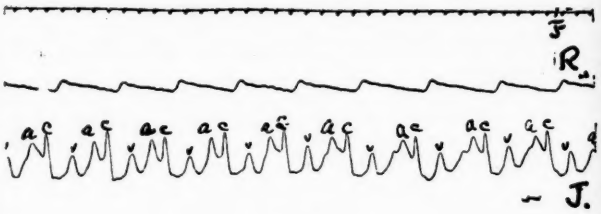

FIG. 1.

patient whose tricuspid valve had for some months been continuously leaking, amply supports the contention; the wave of auricular contraction is well marked, and occupies a normal situation in respect of *c*, the wave caused by the ventricular systole, and this latter is followed at a perfectly normal interval by the *v* wave, which results from the blood stagnating in the auricular chamber prior to the opening of the auriculo-ventricular valves.

When, however, the valvular incompetence progresses we soon begin to notice changes in the venous tracing; the auricle, which at ordinary times was filled solely by the onflow from the veins, is now, in addition, supplied by the regurgitant stream from the ventricle; hence not only is there an overfilling and distension of the upper chamber, but clearly also an auricular filling which is earlier accomplished than formerly it was, and, this being so, one is not surprised to notice that the *v* wave appears prematurely if the tricuspid valve has suffered much damage. To make quite apparent the foregoing remarks one has only to compare the relative positions of the *v* waves in Figs. 1 and 2,

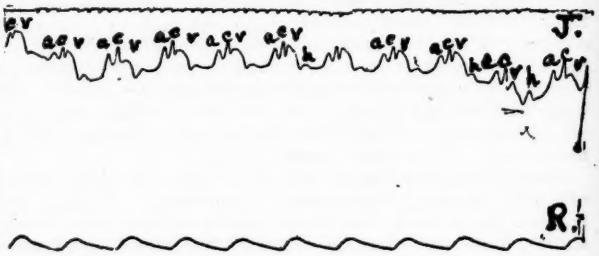

FIG. 2.

which are reproduced to illustrate the first two stages of the condition as recognized by polygraphy.

As time progresses the prominence of the *v* wave becomes more marked, and it merges gradually into *c* wave so that a composite wave is produced, itself ample evidence of the auricular engorgement; but later, and

possibly not until after the lapse of some years, the venous chambers become overtaxed and the auricular muscle, following the protracted period of stress and overstrain, capitulates completely, its wall ceases to contract co-ordinately, and frequently passes into a condition of fibrillation, which, though implying intrinsic activity, is to all intents and purposes useless for the onward propulsion of the blood stream.

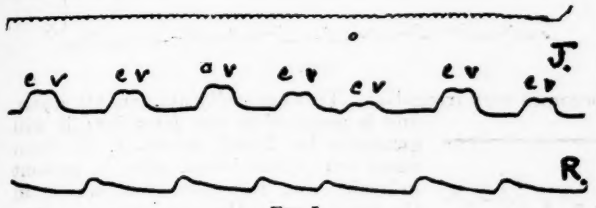

FIG. 3.

Fig. 3. is a tracing typical of this advanced stage in the history of tricuspid incompetence; we notice in it—

1. A complete absence of the auricular waves.
2. A fusion of the *c* and *v* waves.
3. A similarity between the arterial and venous tracings in that in both one observes a systolic filling and a diastolic emptying, a state of affairs entirely different from that observed at all ordinary times.

Bearing these observations in mind, and admitting that they are by no means comprehensive, but, rather, isolated facts which tend towards and amply warrant a careful study of the varied and widely differing phases which the great veins may assume, one would recommend their careful examination as a matter of routine, especially in cardio-vascular disorders, and, in conclusion, suggest that venous auscultation be not forgotten, for by its aid one gains additional advantages, abnormal sounds become audible—for instance, the well-known *bruit de diable*, characteristic of anaemic states, which, caused by loss of tone in the vein walls, is heard best when the patient is in the standing position, also the upwardly conducted venacaval murmur, the sounds resulting from the closure of the venous valves, and, lastly, the clicking sounds to which the rapidly-contracting auricle of auricular flutter gives rise and which are aptly referred to by Morrison as jugular embryocardia.

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[1] Bard, *Archives des maladies du coeur*, etc., May, 1915. [2] Chapman, *Medical Society's Transactions*, vol. xxx, 386. [3] Parkinson *Heart*, vol. vi, No. 1.

THE HEART'S ACTION IN JAUNDICE.

BY
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THE belief is prevalent that the pulse becomes unusually infrequent and at times irregular in rhythm in jaundiced patients. These changes in the pulse are said to occur commonly in catarrhal jaundice, although met with occasionally in jaundice from other causes. It is curious why there should be this difference if, as is stated, the slowing of the heart is due to the action of bile salts on the heart muscle and intrinsic inhibitory mechanism of the heart.

I have investigated the heart's action in a number of jaundiced patients; in some I have found the pulse infrequent, in some irregular, in others both infrequent and irregular, but I have not been satisfied in any case that the jaundice was responsible for the infrequency or the irregularity. It is said the pulse may fall as low as 40 a minute; if by "pulse" is meant rate of ventricle, this rate, then, must be rare. I have not met with an instance in over 100 cases of jaundice. Slowing of the ventricle to 40 or below, whether occasioned by disease or poison, is, with rare exception, due to partial or complete heart-block, and so far as I know heart-block in the course of jaundice has not yet been illustrated.

A pulse-rate about 50 and 55 a minute is not uncommon in patients with jaundice when free from fever and the patient is kept in bed, but this is not proof that the jaundice is the cause of the slow pulse; the patient's normal pulse-rate must be known, and how it behaves in other conditions, because the pulse has a tendency to become infrequent in many non-febrile illnesses when patients are confined to bed. The slowest pulse-rate I have met with due to total bradycardia, in an adult with jaundice, was 50 a minute. The patient was a man aged 65, with severe jaundice from gall stone disease; his normal pulse-rate was about 72 a minute. A year after this attack of jaundice he had severe bronchitis with fever and a fast pulse. When he was getting better the pulse fell to 50 to 52 and kept at this rate until he got about again. I could relate many similar examples; on the other hand, in the vast majority of cases of jaundice in adults I have found the frequency of the heart about or above the normal.

In a number of cases I have found a pulse-rate of 40 and below; but the heart-rate has been double the pulse-rate, the infrequent pulse being due to an alternate premature beat of the ventricle too feeble to send a wave to the wrist. This is shown in Fig. 1.

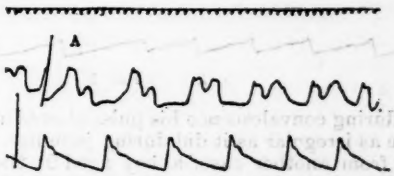

FIG. 1.—Showing two beats of the left ventricle to one of the pulse. A, Apex.

Cases of jaundice with this form of irregularity of the heart and pulse slowing have been published to illustrate the action of the bile salts on the heart, the assumption being that they increase the excitability of the heart muscle, and thus provoke the premature contractions; but there is no other proof advanced, and information is wanting as to the rhythm of the heart before the jaundice occurred and after it had passed off. My own experience indicates no proof that patients with jaundice are more liable to develop extra-systoles than are patients suffering from other toxic conditions. All the cases of jaundice with premature beats I have observed have occurred in persons past middle age; I have not met with any example in a child or young adult, whereas poisons—notably the digitalis group—which in very large doses may produce extra-systoles, do not show this selective action as regards age. In most of my cases of jaundice showing premature beats I know extra systoles were present in health. In some, in which premature beats were noted for the first time during jaundice, I found the extra-systoles persisted long after the patients were free of jaundice, and although this fact does not disprove the provocative action of the bile salts, nevertheless experience has shown that extra-systolic irregularity due to poisons ceases within a few days after the cause is removed. I do not contend that irregularity due to extra-systoles may not be favoured during jaundice—it may be; but I submit it is not because of any action of the bile salts on the cardiac muscle, but because the illness keeps the patient resting. This slows the heart, and premature beats, perhaps only occasional in health, tend to become more frequent with the slower heart action.

As already stated, the pulse is said to be affected more particularly in catarrhal jaundice. This is not a common ailment in adults, and I have notes of only four adult cases; in three of these there was nothing noteworthy in the pulse, in one case sinus irregularity was present. This patient was a woman aged 35; jaundice was marked. In the tracing (Fig. 2) is shown a waxing and waning in rate

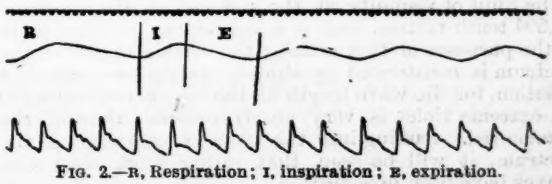

FIG. 2.—R, Respiration; I, inspiration; E, expiration.

of pulse, which is 65 per minute on the average. The variations in length of diastoles are independent of the respiratory movements. I have frequently noticed this relation in sinus arrhythmia induced by digitalis, and the irregularity in this case may be due to the jaundice.

I knew nothing of the patient before this illness, but since, I have taken several tracings at rest without finding any irregularity and an average of pulse of 75 to 80.

Catarrhal jaundice in young people is commonly associated with a slow pulse, the rate being often no more than 50 to 60 per minute. The slow pulse is always irregular, and in my experience the irregularity is always due to sinus arrhythmia.

Fig. 3 is a tracing from a boy, aged 13, with catarrhal jaundice; the rate of the pulse is about 52 per minute; the irregularity is of sinus origin. The pulse-rate in health was usually about 80 and irregular in the same way. A year before this record was taken he had scarlet

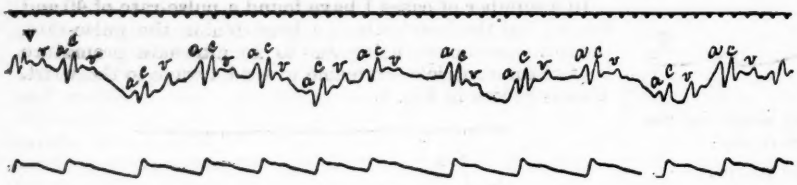

FIG. 3.

fever, and during convalescence his pulse slowed as much and became as irregular as it did during jaundice.

Fig. 4 is from another case, a boy aged 9; the rate is about 63 and sinus irregularity is present. This boy's pulse is usually about 80 and irregular. He had a pulse of 60 after measles two years later.

These tracings are exemplary of a number I have from similar cases. Sinus irregularity is present in about 80 per cent. of healthy children; those who show it usually have a slower rate of pulse than the average for the age, and there is a curious susceptibility in this rhythm for the pulse to become unduly infrequent under conditions which tend to lower the pulse-rate; during sleep, for example,

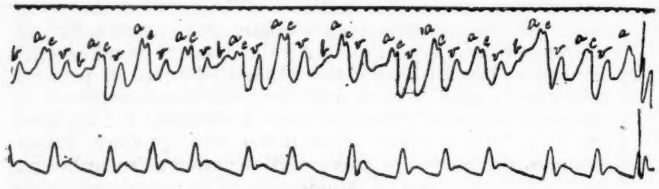

FIG 4.

and after any febrile illness the pulse often becomes very slow and irregular.

In catarrhal jaundice there is usually fever with a rapid pulse before the jaundice appears; when the jaundice comes out the fever goes, and often the pulse suddenly falls in rate—may be from 100 to 120 with regular rhythm to 50 to 60 per minute in course of a few hours—and

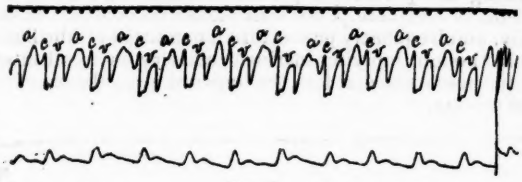

FIG. 5.

becomes very irregular. This naturally attracts attention, and is ascribed to the jaundice; it will generally be found, however, in such cases that sinus irregularity is present in health, and the pulse will behave in the same way in the same patient after any febrile illness; such at least has been my experience.

Poisons which slow the heart have also the power of causing heart-block or hindrance to the passage of *a–v* impulse through vagus inhibition of conductivity. As already stated, no instance of heart-

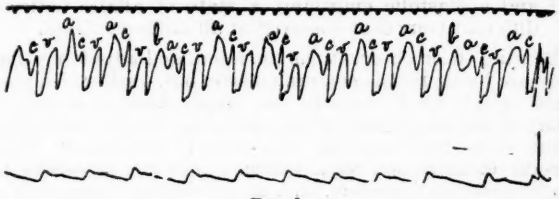

FIG. 6.

block during jaundice has been illustrated. In 1911 I had a case of catarrhal jaundice under my care, in which at first there was seemingly impaired *a–v* conduction, evidenced in the jugular pulse. The patient was a boy aged 13; Fig. 5 is the record taken on the fourth day of well-marked jaundice; the pulse-rate is 75 per minute; impaired conduction is suggested by the lengthened *a–c* interval, which measures about $\frac{2}{5}$ sec. Next day the rate of the pulse had fallen to 68; in the tracing (Fig. 6) there is an additional wave marked *b* with the slower beats; careful examination of this curve will show that the lengthening of the *a–c* interval is apparent only, being brought about by fusion of the waves *b* and *a* during the quicker pulse periods. I have illustrated this fallacy more fully in a paper published in 1912.[1]

REFERENCE.

[1] *Quarterly Journal of Medicine.*

FROM THE VISIBLE TO THE GAMMA RAY SPECTRUM.

BY SIDNEY RUSS, D.Sc.,

PHYSICIST TO THE MIDDLESEX HOSPITAL.

(With Special Plate.)

IN the accompanying Plate (Fig. 1) is represented a chart of the wave lengths of rays ranging from the visible part of the spectrum to *x* rays and the gamma rays of radium. The numbers across the top of the diagram represent the number of octaves which the rays range over; the numbers across the bottom give their respective wave lengths in tenth-metres—that is, ten thousand millionth parts of a metre.

The limit of visibility at the red end of the spectrum is 7,594 tenth-metres, and is a convenient starting-point for the purposes of this article; the visible region of the spectrum is constituted by almost exactly one octave of radiation, for the wave length of the ray corresponding to the extreme violet is very nearly one-half that of the extreme red. Passing into the ultra-violet portion of the spectrum, it will be seen that rather more than two octaves have been investigated.

A region of about six octaves, which remains at present unmapped, separates the extreme ultra-violet from the commencement of very "soft" *x* rays. The most easily absorbed *x* rays whose wave lengths have been determined are the characteristic rays from aluminium with a wave length of 8.4 tenth-metres. As we pass up through several octaves of *x* rays the limit indicated by H is reached; this represents the "hardest"—that is, the most penetrating *x* ray which has, so far, been produced. The line M represents an *x*-ray beam of "medium" penetrating power.

The gamma rays from radium are represented in wave lengths as extending between the two heavily dotted lines on the diagram, and it will be seen that the most penetrating gamma rays are of appreciably smaller wave length than the "hardest" *x* rays so far available. On the other hand, some of the gamma rays are of longer wave length, and therefore more easily absorbed than "very hard" *x* rays.

The two other lines marked Ca and Ag represent the characteristic *x* rays emitted by calcium and silver respectively.

One of the objects of this article is to put forward a plea for a more exact specification of the different types of radiation which are used in experimental investigations and therapeutically. It is submitted that the time has passed when it sufficed to record, for example, that exposure to hard *x* rays caused the disappearance of a malignant growth, or that a lethal effect was observed

SIDNEY RUSS: FROM THE VISIBLE TO THE GAMMA RAY SPECTRUM.

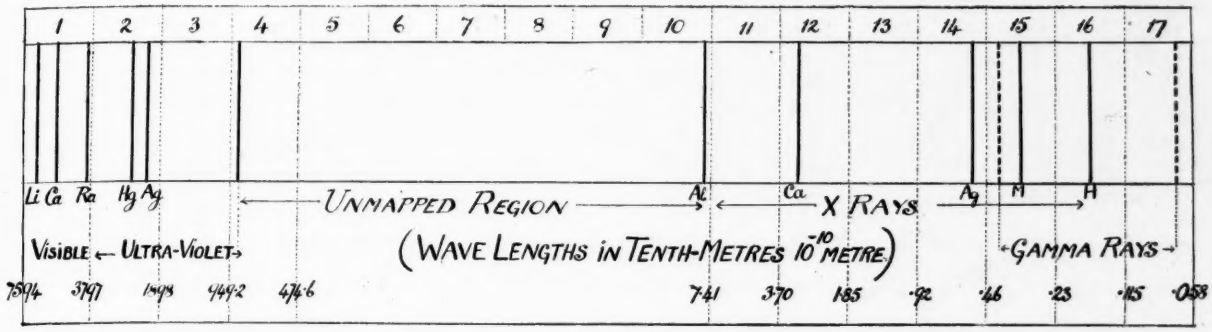
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Li Ca Ra Hg Ag
UNMAPPED REGION
Al
Ca
X RAYS
Ag
M
H
VISIBLE ← ULTRA-VIOLET →
(WAVE LENGTHS IN TENTH-METRES 10⁻¹⁰ METRE)
GAMMA RAYS →
7594 3747 1849 4492 4746
741 370 185 ·92 ·46 ·23 ·115 ·058

FIG. 1.

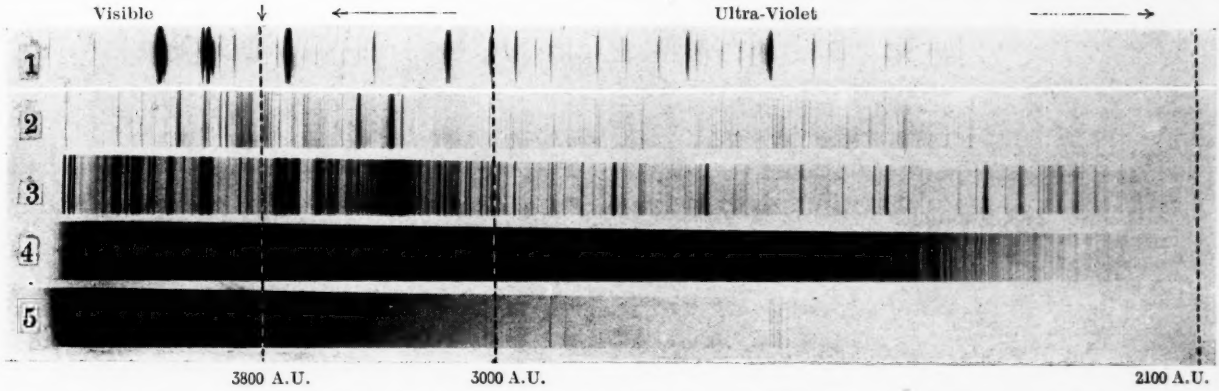

FIG. 2.—Sources of Ultra-Violet Light. 1. Mercury arc. 2. Silver arc. 3. Copper arc. 4. Simpson arc. 5. Carbon arc.

FIG. 3.—Absorption of Ultra-Violet Light by Human Skin. 1. Unscreened radiation from the Simpson arc; exposure 5 seconds. 2. Screened by one-tenth of a millimetre of skin; exposure 2 minutes. 3. Screened by one-half of a millimetre of skin; exposure 8 minutes. 4. Screened by one and a half millimetres of skin; exposure 8 minutes.

FIG. 4.—Ultra-Violet Spectra of Simpson Arc and Pure Tungsten Arc. 1. Simpson arc. 2. Pure tungsten arc.

upon some organisms by submitting them to ultra-violet light.

THE X-RAY SPECTRUM.

The data are at hand for introducing an added degree of precision in specifying the type of radiation which is utilized. The matter may be illustrated by an example selected at random. The term "hard *x* rays" is understood to mean *x* rays which have a high penetrating power; for the production of such rays a bulb would be run with a parallel spark-gap of about 20 to 25 cm. The radiation from such a bulb is, however, heterogeneous; a screen of aluminium 2 mm. thick will cut out the "soft" constituents, but the rays are not yet homogeneous, for an additional 1, 3 and 5 mm. will cut out various other components of the beam until it becomes practically homogeneous with a wave length of almost exactly 0.2 tenth-metres. The beam of "hard *x* rays" in these several cases may range over an octave of wave lengths, and different reactions are exhibited by tissues according to whether they are exposed to radiation at one or the other end of the octave. It is suggested that a statement of the range of wave lengths utilized would eliminate many of the uncertainties introduced by such terms as "hard," "medium," and "soft."

Reference may be made here to one difficulty that presents itself with regard to *x* rays. The question arises as to what regions of wave length are to be assigned to the radiation which is commonly known as "soft," "medium," or "hard." Reference to the diagram shows that *x* rays have been mapped over a region of about 5½ octaves. The rays "characteristic" of aluminium (8.4 tenth-metres) are "very soft," for they are absorbed by a few centimetres of air; in fact, over the three octaves from this starting point the radiation might be termed "very soft." The next octave—namely, from 1 to 0.5—includes the characteristic rays from platinum and a good part of the unscreened rays from a "soft" bulb (5 to 10 cm. spark gap). The next octave would then comprise "medium" rays; any radiation of smaller wave length than 0.25 could safely be considered as "hard." This subdivision is quite arbitrary, and it is hoped that the Röntgen Society will make some definite recommendations on this subject in the near future.

We may briefly consider the remaining features of the diagram. It will be seen that a portion marked "unmapped region," which comprises about six octaves, separates the extreme ultra-violet from the very "softest" *x* rays. There are good reasons for believing that ether vibrations in this region, that is, of wave lengths ranging from 900 to 9, are very easily absorbed by matter, and this is no doubt, in part, the reason why the other properties of these vibrations have not yet been investigated. Such radiations, however, should not be dismissed from our minds, for it is by no means unlikely that these six octaves of radiation play some part in the reactions of tissues, when they are exposed to the *x* rays or the rays from radium. If we may apply the information which has been gleaned from the *x* ray spectrum we might suggest that the amount of this "unmapped" radiation excited in tissues depends not only on the intensity of the beam of *x* rays, but to a very large extent upon the particular wave lengths utilized. The main chemical constituents of most tissues are essentially the light elements, and all the evidence goes to show that the secondary *x* rays given out by them under the influence of a primary beam would be very easily absorbed; these rays may even be so slightly penetrating as to be mainly absorbed within the cells from which they originate. Now it is safe to say that more of such radiation would be provoked by a beam of "soft" *x* rays than by a "hard" beam of equal intensity. Such a secondary process, initiated by the primary beam, may in fact play a dominant part in determining what is spoken of as the reaction of the tissues. The fundamental fact that the human skin when exposed to "soft" and "hard" *x* rays of equal intensity reacts in an entirely different manner has not, so far, received a rational explanation, and it may be appropriate in this connexion to invoke the above probability which is suggested by general considerations of the spectrum.

THE DANGERS OF X RAYS.

Let us now turn to a second aspect of this spectrum, which impresses one more and more of its potentiality for harm as well as for good.

When the first warning was sounded of the damage which *x* rays did to operators who were insufficiently protected from them, additional precautions were taken to obviate the dangers as far as these were known at the time. The range of ray which may be utilized has, however, greatly widened as the result of investigation, and this is especially the case for radiation of a high penetrating power. It may well be questioned whether the precautionary measures have extended simultaneously with the wider range of radiation utilized and with the more exacting conditions under which so much of the present *x*-ray work is conducted.

There are two main aspects of the application of *x* rays which may be briefly considered. When the rays are administered therapeutically it is a desideratum to be striven after that whoever dispenses the ray should receive no fractional part of the dose given. This becomes increasingly difficult to secure when the more penetrating rays are used, and it is precisely when the step is made from one phase of *x*-ray therapy to another, such as from the treatment of superficial conditions to what is known as deep-therapy, that it becomes necessary to reconsider the efficiency of methods of protection which, eminently suitable for the former, are inadequate for the latter. When it is borne in mind that "hard" *x* rays have a penetrating power so high that the intensity of a beam is only cut down to 10 per cent. of its intensity by going through about 12 or 13 cm. of tissue, the difficulty of adequate protection from such radiation will be apparent.

When we turn to the other aspect of the utility of the rays, namely, in radiographic and screen work, the dangers are of rather a different character, though no less real.

The conditions under which the radiographic work necessitated by military affairs is conducted are often very exacting, and this is particularly the case in screen work; such procedure involves the proximity of the operator to the bulb, and however efficient the protective devices may be, it is almost impossible to arrange that the operator does not become irradiated to some small degree. The protective devices cannot be pushed to the limits which are possible under other conditions, for the gloves worn by the operator must not be so cumbersome as to hinder his manipulations, the lead glass of the screen which protects his face must not be so thick as to interfere unduly with the visibility of the picture he interprets, and so on. Again, it has to be recognized that an installation which provides reasonable protection to any one engaged upon it for short or intermittent periods may be quite inefficient when use is made of it for periods of a good many hours per day.

In the light of our present knowledge it cannot perhaps be stated what is a safe limit for an operator to be the daily recipient of in the way of *x* radiation, but it would appear certain that unless stringent precautions are taken, damage—perhaps irremediable damage—will be done to those who are engaged in one of the branches of medical work the importance of which can hardly be overestimated.

ULTRA-VIOLET RADIATION.

Ultra-violet rays have been investigated over a range of rather more than two octaves. The first octave beyond the visible portion of the spectrum, with wave lengths from 3,800–1,900 A.U.,* is the region of therapeutic interest, for the radiation beyond this, and forming the second octave, is so easily aborted by air that investigation of it has to be carried out in a vacuum.

In Fig. 2 are reproduced photographs of the ultra-violet radiation from various arcs taken by means of a quartz spectrograph. They are respectively (1) mercury, (2) silver, (3) copper, (4) the Simpson arc, and (5) carbon. It will be seen that the spectrum of mercury vapour does not extend quite so far as that of silver, which, again, has not so large a range as copper. The Simpson arc consists of pole pieces of wolframite, the main constituent of which is tungsten. The radiation from this arc is very rich in ultra-violet rays, and an examination of it shows that it consists of a large number of emission lines which do not vary locally very greatly in relative intensity from one another, although the photographic intensity of the rays gradually fades off toward the region of short wave lengths. The general character of the spectrum of the Simpson arc appears, therefore, to be one rich in ultra-violet radiation, which is graded fairly uniformly throughout the region

* A.U., that is, Ångstrom unit, is one-tenth metre.

under consideration; this is in marked contrast to the arc spectrum of copper, which is seen to consist of groups of very bright lines, with considerable intervals between them. The carbon arc (5) is seen to have a somewhat restricted range of ultra-violet radiation.

THE PENETRATING POWER OF ULTRA-VIOLET LIGHT.

When any of the various sources of ultra-violet light are used therapeutically the question arises as to how far the rays are able to penetrate through the tissues. It has long been known that blood pigments are strongly absorbent of such radiation, and means were accordingly taken to prevent, as far as possible, direct access of the blood to the part receiving the rays.

It seemed desirable, however, to make some measurements of the extent to which the ultra-violet rays penetrate the skin. For this purpose skin removed from the human abdomen was used; it was cut parallel to the external surface in layers $\frac{1}{10}$ mm., $\frac{1}{2}$ mm., and $1\frac{1}{2}$ mm. thick by means of a large-sized microtome; these different thicknesses of skin were then placed in front of the slit of the spectrograph, to ensure that any radiation entering the instrument and affecting the photographic plate placed in position, would first have penetrated the particular thickness of skin.

The source of ultra-violet radiation selected was the Simpson arc. When this was placed about 20 cm. distant from the slit of the spectrograph an exposure of a few seconds was sufficient for a photograph of this radiation as far as wave length 3,000. In order to bring out the very short wave lengths the plate has to be rather over-exposed in the violet region (see Fig. 3, No. 1). The exposure in this case was 5 seconds.

It was soon found that skin was very absorbent for the ultra-violet radiation, and consequently the time of exposure had to be much increased in order to obtain any record on the photographic plate. Fig. 3, No. 2, shows the result of interposing $\frac{1}{10}$ mm. of skin in front of the slit of the instrument; the exposure was increased from five seconds to two minutes. No. 3 and No. 4 show the results for a thickness of $\frac{1}{2}$ mm. and $1\frac{1}{2}$ mm. respectively; the exposures were in each case eight minutes—that is, nearly one hundred times that of the unscreened radiation. In spite of this, however, a large portion of the spectrum is cut out.

It will be seen, therefore, that ultra-violet rays of wave lengths 2,100 to 3,000 A.U., the approximate positions of which are indicated in Fig. 2, are very easily absorbed by human skin; certainly less than one part in a thousand of this radiation penetrates to a depth of half a millimetre.

As we proceed to the region of wave lengths 3,000 to 3,800 A.U., which latter marks the onset of visible radiation, the rays become rather more penetrating, but it is doubtful whether as much as 1 per cent. of the radiation penetrates as deep as 1 mm. Fig. 3, No. 4, shows, however, that a small percentage of ultra-violet radiation penetrates $1\frac{1}{2}$ mm. of human skin.

THE SPECTRUM OF THE SIMPSON ARC.

The poles of the Simpson arc are said to consist of wolframite, a prominent constituent of which is tungsten.

In order to see to what extent tungsten contributes to the ultra-violet radiation from the Simpson arc, two electrodes of pure tungsten were obtained, and the arc spectrum photographed in the same way as indicated above for the Simpson arc.

In Fig. 4, No. 1 is a photograph of the spectrum of the Simpson arc, between wave-lengths 5,800 and 2,100 A.U. No. 2 is a photograph of the spectrum of a pure tungsten arc over the same region; the exposures were for five and ten seconds respectively.

Inspection shows that the two spectra are apparently identical. Whether there are differences in the relative intensities of the emission lines cannot be said without a more extensive examination.

THE last report of the librarian of the Harvard Medical School states that 3,100 volumes have been added to the collection during the past year. The library now contains 27,000 volumes and 46,067 pamphlets. The College of Physicians of Philadelphia has 105,540 volumes; the New York Academy of Medicine, 100,320; the Boston Medical Library, 83,107; and the Johns Hopkins Hospital, 17,000.

SODIUM HYPOCHLORITE IN THE TREATMENT OF SEPTIC WOUNDS.

BY

FLEET SURGEON FREDERICK J. A. DALTON, R.N.

IN September, 1915, a committee was sent to the Gallipoli peninsula in the naval hospital ship *Rewa*, by order of the Medical Director-General of the Navy, to report on the efficacy of hypochlorites in the treatment of infected wounds. The committee made two trips to the beaches in this ship—one to Anzac and one to Cape Helles. Unfortunately for their purpose, there was at this time very little attacking going on at the peninsula, and although 1,176 patients were carried in the two trips, the majority were cases of dysentery, enteric, and epidemic jaundice, and the proportion of wounded to sick was very small. The committee returned to England on October 18th.

Before leaving, Dr. H. D. Dakin, who was working in connexion with the Medical Research Committee, asked me to continue the investigation of the value of hypochlorites as opportunity offered on this ship, and this has been done.

In the past two months we have carried an additional 2,753 cases to Alexandria and Malta, but of this large number only a very small percentage have been wounded.

Every wounded patient received on board during this period, whose wound or wounds were clinically septic on arrival, has been treated with the special sodium hypochlorite solution prepared according to Dakin's formula. No other form of antiseptic was employed. Although this report is based on the small total of 57 cases, the results have been so uniformly and consistently good that I think it may be useful to publish it now, in order that the hypochlorite solution may be more generally used in the treatment of wounds than is the case at present.

Wounds that were clinically clean on arrival on board were also irrigated with the sodium hypochlorite solution and dressed with gauze soaked in the antiseptic. But these cases are not considered in connexion with this report since they would probably have remained clean and healed with any other form of customary dressing, and therefore cannot be counted as evidence in favour of hypochlorites being far superior to any other form of antiseptic that we have so far used on board this ship; that being the point I wish particularly to bring out.

Before employing the sodium hypochlorite antiseptic, my colleagues and I in this ship used various weak antiseptic lotions for the thorough irrigation of these large septic wounds, each fancying his own pet solution—be it carbolic acid, perchloride of mercury, etc.—gave the best results. My own predilection was for passing pints of ordinary sterile salt solution through the wound. Since making trials of the hypochlorite solution there has been absolute unanimity among us as to the preference for it, and we all now use it as our routine lotion.

Preparation of Hypochlorite Solution.

The antiseptic solution is made on board from dry carbonate of soda (United Alkali Co.'s best soda ash), bleaching powder of good quality, and boric acid, according to Dakin's directions given in the BRITISH MEDICAL JOURNAL, August 28th, 1915. The solution was made in large carboys holding about 40 litres.

Five hundred and fifty grams of the carbonate of soda were dissolved in a carboy half filled with fresh water; 800 grams of bleaching powder were then added, and the mixture thoroughly shaken for five minutes. The carboy was then filled up with fresh water, and, shaking the mixture once more, it was allowed to settle for half an hour. The clear fluid over the precipitate of calcium carbonate was siphoned off as completely as possible, and filtered into a second carboy by passing through a plug of cotton in the neck of a large funnel; 150 grams of boric acid were added to the filtrate, and the mixture was then ready for use. It was drawn off from the carboy as needed by means of a siphon.

The solution was never kept longer than a week, and any unused solution that had been made longer than a week was thrown overboard. This waste is a matter of no moment since the cost of the preparation is so extremely small.

Method of Use.

The usual surgical procedures were adopted for enlarging the wound, making counter openings, removing portions of detached bone, foreign bodies, including bits of clothing, fragments of shell, bullets, gravel, etc. Every portion of the wound was then thoroughly irrigated with large quantities of the hypochlorite solution. One or several rubber tubes, according to the nature of the wound, serving for the introduction of the hypochlorite solution, were then inserted, and strips of gauze arranged around the tubes and lightly packed into every portion of the wound. It is essential that this should be properly done, the idea being that the gauze strips function simply as wicks to convey fresh hypochlorite during subsequent treatment to every surface of the wound.

The outer surface of the wound is then dressed with gauze lightly wrung out in the hypochlorite solution. The ends of the rubber tube or tubes are brought out through the gauze dressings, a bandage lightly applied over all to keep tubes and dressing in position, and the ends of the tubes brought out through the bandage, to serve for the subsequent renewal of the hypochlorite.

In profoundly septic cases the hypochlorite solution is injected into the tubes, by means of a glass syringe, every two hours for the first twenty-four to forty-eight hours, and subsequently less frequently as the wound begins to clean up. In less severe cases we find by experience that syringing with hypochlorite at four-hourly intervals suffices. Each case should be treated, so far as frequency and quantity of hypochlorite administration is concerned, with regard to the size, nature, and septicity of the wound. The object aimed at is to supply every surface of the wound with a sufficiency of fresh hypochlorite solution as often as required.

In bad cases the gauze strips are renewed after the first twenty-four hours. With slighter wounds they may be left in for three to four days, and then usually do not need to be replaced by fresh strips, as the wound generally cleans up with simply occasional squirting of fresh solution into the tubes.*

NOTES OF CASES, ETC.

The cases were under the personal care of Staff Surgeon Fisher, R.N., temporary Surgeons Smith and Beaton, R.N., and Surgeons Gilbertson and Chitty, R.N.V.R. They comprise a great variety of bullet, shell, shrapnel, and bomb wounds, and a number of cases of gangrene following frost-bite. In addition, several stinking appendix abscess cavities were successfully treated with careful irrigation and swabbing with the hypochlorite solution.

It does not seem worth while to reproduce the case notes in full, since this would involve much needless repetition. A few typical cases are selected, to which are added the notes of the surgeons in whose care the patients were.

The use of hypochlorite in cases of frost-bite with broken skin, or where gangrene and sloughing have supervened, appears to be distinctly valuable. Sloughs are rapidly removed, and it accelerates the production of healthy granulation tissue. In gangrenous cases its deodorant action is very marked, but it is important that severe cases should be treated not less frequently than four-hourly. A single typical case is briefly noted at the end.

CASE I.

H. R. D. Gunshot wound of lip, neck and vertebrae, piercing first rib with exit over sixth dorsal spine. A haematoma of the neck was cleaned out and hypochlorite injected into the cavity at frequent intervals. After four days there was no sign of pus, and the hypochlorite dressings were applied only twice daily.

CASE II.

A. H. G. Septic wound of left buttock with cellulitis. Operation November 29th. Wound was opened up, leaving very dirty sloughy surface, 6 in. long, with foreign bodies in it. Hypochlorite was applied four-hourly. The cellulitis rapidly cleared up, and in four days the wound was covered with clean granulations.

CASE III.

M. R. Compound fracture of left upper humerus. The patient was admitted December 15th, after treatment on shore for one week. The wound was septic, with much pus and oedema of arm. The hypochlorite was given three-hourly. December 16th, temperature 98.6° to 99.4°. December 17th, necrosed bone removed; much less pus. December 19th, temperature 99.2° to 99.4°. December 21st, almost all trace of pus disappeared, with wound surfaces clean. The counter opening was healing, and granulations were felt to be covering the bone surfaces.

CASE IV.

M. M. Rifle bullet wound of left leg. Very septic when received, October 29th, with iodine vesication and much inflammation. Hypochlorite was used twice daily. On November 2nd the wounds were clinically clean, and all inflammation and swelling had subsided.

CASE V.

A. W. O. Compound comminuted fracture of right ulna in upper third. When received on board, the wound had been thoroughly opened up, but was extremely septic, with much inflammatory oedema of the part. The superficial areas were dirty, and thick yellow malodorous pus drained out in large quantities. A large rubber tube was inserted, and surrounded with light gauze packing. Hypochlorite solution, 20 c.cm., was injected every two hours. Within a week the clinical appearance of the wound was absolutely healthy. The pus was replaced by a clear mucoid secretion, and the surfaces were covered with red healthy granulations. The swelling and oedema entirely disappeared, and the wound progress was most satisfactory.

CASE VI.

G. J. Rifle bullet wound of left arm above elbow-joint, involving the ulnar nerve and the external condyle of the humerus. An operation had been performed on shore before the patient was received. The bullet and fragments of bone had been removed, but the wound had been closed. Within a day of admission the arm was much swollen, and inflammatory oedema extended from the joint upwards. The forearm was much swollen also.

The wound was opened up, and a rubber tube inserted, passing to the site of the fracture. Hypochlorite, 20 c.cm., was given every two hours. The pus, which drained at first rapidly, changed to a mucoid secretion, and the inflammation and oedema rapidly diminished, and had disappeared at the end of five days. The tube was then removed and a simple dressing applied. The wound granulated perfectly, and at the end of ten days there remained only an area the size of a threepenny piece to be covered.

CASE VII.

A. B. Bomb wound of right leg. Received on board October 29th, three days after injury. Perforating wounds of calf, entry and exit 2½ in. apart; much pus present; temperature 104°. The wounds were incised; a pocket extending upwards was opened, and the whole freely irrigated with hypochlorite. The following day the temperature fell to 98° and did not subsequently rise above 99°. Three days later the wound was clean, with no discharge, and all swelling and inflammation had gone.

CASE VIII.

A. W. Bomb wounds of left leg received October 26th. Treated on board October 29th. Several severe wounds, all septic; one over external malleolus, penetrating the bone; a second on dorsum of foot, midway between two malleoli; a third in the middle of the leg, between the tibia and tibialis anticus muscle; and a fourth below and behind the head of the fibula.

The wounds were very dirty, but when opened up fragments of bomb were only found in the fourth wound. Hypochlorite dressings and injections by tube were used freely. After three days all the wounds appeared clean with the exception of the wound in the dorsum of the foot, where there was some cellulitis. It was explored, and a small pocket opened and emptied of pus. A tube introducing hypochlorite was inserted, after which marked improvement took place until the patient was discharged.

CASE IX.

A. H. Shrapnel wound of left leg received October 26th. Compound comminuted fracture of tibia in the lower third. The patient had been operated on ashore, and was received on board October 30th. The dressings were stinking, and the surface of the wound extremely dirty. Free irrigation with hypochlorite and subsequent injections were employed. The wound was far from being in a satisfactory condition when this case was discharged three days later, but, considering the state of the wound on admission, the improvement was really wonderful.

CASE X.

D. M. Perforating bullet wound entering right malar bone and emerging just below the angle of the jaw, causing a large neck wound, and ploughing up the surface of the trapezius muscle for 3 in. at a depth of 1 in. Temperature on admission 104°. The wounds were cleaned, dressed with gauze soaked with hypochlorite, and carrying tubes for its renewal. On discharge, five days later, the temperature was normal and the wounds in the cheek and trapezius muscle were clean. The wound in the neck was suppurating slightly with some inflammation of the submaxillary gland.

CASE XI.

T. B. Compound comminuted fracture of right femur caused by shrapnel bullet. The wounds on the front and back of the thigh were freely incised, but no bone was removed. Rubber tubes were inserted to carry hypochlorite to the bottom of the wounds and the cavities lightly packed with gauze. The hypochlorite was renewed every two hours at first. The wound remained clean and did well.

* Information relative to the use of sodium hypochlorite for the early treatment of wounds before sepsis has developed will be found in the BRITISH MEDICAL JOURNAL, October 23rd, 1915, p. 609, and November 27th, 1915, p. 790.

CASE XII.

A. J. H. Shrapnel bullet wound over right frontal bone. Depressed fracture; trephine necessary when depressed bone removed with piece of bullet. Dura uninjured. Temperature on admission 102°. On discharge, five days later, temperature was normal and the wound almost healed.

CASE XIII.

G. A. N. Compound fracture of left humerus, received October 26th. Musculo-spiral nerve exposed and partly divided. The whole track and wounds of entry and exit were very foul and stinking, with redness and oedema of the whole upper arm, when the case was received on board on the 29th. The wounds were enlarged, drained, and irrigated four-hourly with hypochlorite. No spread of sepsis occurred and redness and oedema rapidly subsided, as did the offensive odour. When discharged, four days later, the wound was lined with healthy granulations and there was only a trifling discharge of pus.

CASE XIV.

G. T. Compound fracture of jaw and shell wound of right arm. The fragment of shell had entered at the tip of the right shoulder and emerged above the external condyle of the humerus. All the wounds were horribly offensive. They were irrigated with hypochlorite under anaesthesia, and many loose fragments of jaw and detached teeth were removed. Four-hourly irrigation with hypochlorite was adopted, and the patient was given a chloramine mouth wash. On discharge, four days later, the patient's mouth was remarkably clean, but the external jaw wound was still discharging though relatively clean in appearance. Sloughs had all separated. The arm wounds were clean and lined by healthy granulations.

CASE XV.

W. C. When received on board the right foot was gangrenous as regards the soft tissues up to the base of the metatarsals; its appearance was black with an intense zone of inflammation of the higher part of the foot. The left foot was gangrenous to the base of the proximal phalanges, with similar signs of intense inflammation. The odour was appalling. Hypochlorite baths were used and at once removed the odour. In two or three days the dead soft tissues had softened and could be quite easily removed. The wounds took on a healthy aspect, and the granulations were red and clean.

CONCLUSIONS.

The advantages we have observed in the employment of the sodium hypochlorite solution in the treatment of septic wounds may be briefly stated as follows:

1. The simplicity and cheapness of preparation of the antiseptic.
2. Being non-toxic and non-irritating to the tissues when properly prepared according to Dakin's formula, the hypochlorite solution may be safely used in large quantities over long periods of time without ill effects.
3. The deodorant action of the solution is remarkable. The fetor from gangrenous tissues usually disappears in twenty-four hours.
4. The rapidity with which sloughs separate and clean granulation tissue is formed in a wound under its influence.
5. The infrequency of redressing required by cases treated as described with hypochlorite, compared with the constant change of dressings required in large wounds with other forms of antiseptic.
6. The fact that injections of the hypochlorite solution into the rubber tubes used in the dressings may with safety be entrusted to very imperfectly trained orderlies without fear of ill results, once the case has been adequately dealt with by the surgeon.

The facts referred to under (5) and (6) are very important considerations in war surgery, as cases frequently arrive in large numbers at varying intervals.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TYPHOID PERFORATION: OPERATION: RECOVERY.

THE following case of perforation in a man suffering from unsuspected typhoid (no doubt modified by inoculation) is, I think, of interest as emphasizing the importance at the present time of a strict investigation into all cases of pyrexia, even when unaccompanied by other marked symptoms. It is also worth recording from a surgical point of view, since recovery took place in spite of the fact that operative measures were unfortunately not taken until some eighteen hours after the accident.

Pte. C. was admitted to the Reading War Hospital on September 17th, 1915, having been wounded in Gallipoli on August 24th. On admission he had a small healed entrance wound in the buttock and an irregular open wound, about an inch in diameter, on the inner aspect of the thigh, where the bullet had emerged. He appeared in good health. He stated that he had been inoculated against typhoid in November and December of the previous year (two inoculations).

On September 28th it was noted that there had been some pyrexia since he had been in hospital, the temperature ranging from 100° to rather over 101°, though frequently down in the morning to normal. The man said that he felt perfectly well except that now and again he suffered from headache. His bowels had on several occasions been somewhat relaxed. No abnormal physical signs could be detected in chest or abdomen, and the tongue was clean. The pulse had varied with the temperature from 90 to 112. The wound had nearly healed.

On arrival at the hospital on the morning of October 1st I was informed that the patient had complained the previous afternoon of sudden severe pain in his stomach, and now appeared to have serious abdominal mischief. I found him with a temperature of 103.4°, a pulse of 136, and all the signs of an acute abdomen.

He was at once taken to the theatre and laparotomy performed. There was general peritonitis, with a quantity of free pus; the lower part of the ileum was covered with masses of lymph, and a perforation a quarter of an inch across, evidently the result of typhoid ulceration, was present in this portion of the bowel. I closed the hole with some difficulty, on account of the condition of the gut, and drained by means of a large tube passed down into the pelvis. The usual after-treatment for general peritonitis was adopted, and the patient made an excellent recovery, the only trouble being some suppuration in each breast where he had received subcutaneous saline infusion. He had fairly typical typhoid stools for about ten days after the operation, but by October 19th the temperature was normal. There was a short relapse from October 31st to November 11th. The patient is now (December) nearly well.

Bacteriological examination of the stools shortly after the operation showed the presence of a non-lactose fermenting bacillus, typhoid or paratyphoid (the exact identity not determined). On November 7th it was found that the blood agglutinated *B. typhosus* up to 1 in 500 dilution, but had no effect on *B. paratyphosus* A or B.

Reading. W. BERNARD SECRETAN, M.B., F.R.C.S.

A SECOND CASE OF COMPLETE INVERSION OF UTERUS.

MRS. R., aged 30, was confined early in September. She looked very delicate and fragile, and the pains were weak from inertia of the uterus. A little chloroform was given, and the delivery was very easily effected by forceps. The placenta caused no trouble, and the uterus contracted normally. All went on well for fourteen days. The nurse then assisted the patient to stool, when on pressure a pain was felt, and "something seemed to come down." On my arrival I found the fundus uteri well outside the vulva and still being extruded; there was no bleeding. An hour later Dr. Maclagan gave chloroform, and reduction was accomplished after some patient work in ten minutes or less. As in my previous case (BRITISH MEDICAL JOURNAL, 1910, vol. i, p. 260), the method by direct pressure on the fundus was not successful and was not long persevered with, whereas the other method was very readily effective. I reduced the bulk of the tumour into the vagina followed by the right hand, grasped the neck of the mass with the finger tips surrounding, and worked at it exactly as one would reduce a hernia. The patient made a good recovery. I venture to record this case on account of its very great rarity, and, after my experience, would suggest to any one who may be unfortunate enough to encounter this formidable accident that the method I have attempted to describe will most readily be successful.

C. L. FRASER, F.R.C.P., F.R.C.S.Ed.
Berwick-upon-Tweed.

DR. CHARLES RICHET, professor of physiology in the University of Paris, who is now serving in Russia, has been elected an honorary member of the University of Moscow.

Reports of Societies.

GUNSHOT WOUNDS OF THE CHEST.

At a meeting of the Medical Society of London, on Monday, January 17th, the President, Dr. W. PASTEUR, being in the chair, a discussion took place on gunshot wounds of the chest.

Colonel Sir J. ROSE BRADFORD, who opened the discussion, said that the material from which his paper was constructed was provided by the base hospitals in France from October, 1914, to the present time. Many hundred cases had been seen, several of which were very severe. Some had arrived at the base hospitals within two or three days after the injury, but the interval was usually longer. Some had been seen at the casualty clearing stations within twenty-four hours. The cases had been studied in collaboration with Major T. R. Elliott and Captain Hubert Henry. Sir J. Rose Bradford said that haemothorax might follow a wound in some part other than the chest, such as one of the arm or neck. In these circumstances the chest condition might be overlooked, and mistakes might easily arise. Among the results which might follow gunshot wounds of the chest were haemoptysis, haemothorax, pleurisy, empyema, and pneumothorax. Haemoptysis might be a consequence of infarction after bruising, when there was therefore no proof that the missile had penetrated the lung. The haemothorax was not different from the ordinary variety of the condition, but was frequently infected. The pleurisy was often streptococcal, and frequently progressed to empyema. Pneumothorax was not infrequently accompanied by a large opening in the chest. When a large gaping wound was found in the lower half of the chest the lung was often clearly visible, and was not often completely collapsed. Despite the severity of the injury such cases might progress very favourably. When the wound occurred in the upper part of the chest a counter-opening was usually necessary.

He then considered the subject of penetrating wounds of the chest and lung. Haemothorax and even pneumothorax might be found on the side opposite to the wound in the chest. Such cases were often very puzzling at first. Sometimes a bilateral haemothorax was encountered when the bullet penetrated the thorax transversely. This occurrence was not uncommon with or without the lodgement of the missile. The pericardium was occasionally wounded, and recovery might even occur after so severe a result as haemopericardium. Surgical emphysema often accompanied haemothorax; it was usually limited, but was occasionally very extensive, and in one case had been general. The peculiar percussion note which it produced might suggest the presence of pneumothorax, and the sharp crepitations heard over it might cause it to be confounded with pleurisy. The haemothorax was infected in 25 per cent. of the cases.

Sterile Haemothorax.

The degree of collapse of the lung in sterile haemothorax varied with the amount of haemorrhage. In many cases the lower or middle lobes were collapsed, whilst the upper lobe was over-distended to an extreme degree, and floated on the upper surface of the blood. This was a very characteristic feature. The bloody fluid in the pleura was really defibrinated blood containing in some cases an added exudate from the pleura. The method which had been recommended for determining the degree of dilution of the blood by the number of red blood corpuscles he considered quite misleading, for it took no account of the number bound up in the clot. Regarding the advent of clotting, it had certainly taken place by the fourth day, and probably much earlier.

Symptoms.—Dealing with the symptoms, he spoke of the distressing cough and anxiety in the early stages. Haemoptysis occurred in a large proportion of the cases. It was sometimes deferred for three or four days, probably when due to bruising, and there was therefore an early and a late variety of this symptom. It was very seldom fatal; he had only met with one example of death from it in well over 1,000 cases. Cough was usually very troublesome. Dyspnoea was slight after the onset. Very slight icterus might occur after the first week, but not to such an extent as after haemorrhage into the peritoneal cavity. Usually a slight fever was detectable, but this was as high as 103° or 104° F. only in exceptional cases. According to the temperature three groups of cases were recognizable: (1) Those in which the temperature fell immediately after paracentesis; (2) those in which it did not fall in this way although no infection was present, but fell slowly after two or three weeks—such cases were not very common; (3) those in which a sudden pyrexia appeared after two or three weeks and disappeared after paracentesis; these cases were exceptional.

Physical Signs.—The signs were not those merely of pleural effusion. At first there was a remarkable absence of definite signs; the percussion note might be only slightly impaired, and numerous râles and rhonchi might be heard. Twenty-four hours later most obvious signs might appear. The degree of displacement of the heart was not dependent upon the amount of effusion. The area of skodaic resonance above might be very marked. The breath sounds might be tubular or even amphoric and bronchophony and pectoriloquy were frequent. The diaphragm on the affected side was extraordinarily high, and it was not unusual for the stomach resonance to merge into the skodaic resonance above. Points of distinction from pleural effusion were the tubular breathing, bronchophony and pectoriloquy, and the more marked skodaic resonance. The heart's apex beat often underwent a peculiar change in position. It might at first be displaced considerably and then return towards the normal position in a day or so. Retraction of the affected side might be rapid if aspiration were not performed, and was more marked than in pleural effusion. Collapse of the lung played a greater part in the development of physical signs than it did in pleural effusion. The presence of vocal fremitus did not exclude haemothorax. In one group of cases the signs resembled those of massive collapse of the lung, and cleared up in a few days except at the extreme base, where was situated a small haemothorax.

Diagnosis.—A common error, he said, was to confuse haemothorax with pneumonia, and to label the case "traumatic pneumonia." Pneumonic consolidation on the side of the lesion, he thought, must be extremely rare. Another distinction which had to be made was between haemothorax and pneumothorax or pneumo-haemothorax. The position of the apex beat was of considerable service. As to the determination of the size of the effusion, it appeared that 2 or 3 pints usually caused dullness as high as the middle of the scapula. The presence of infection of the haemothorax could only be determined accurately by a bacteriological examination of the fluid, but it might be inferred by the general state of the patient and his degree of illness and of pyrexia.

Treatment had at first been by the expectant method, but although the patients did well the condition was protracted and they ailed for some time. With the employment of aspiration combined with oxygen replacement, the lung rapidly re-expanded and the pyrexia quickly subsided. The collapse soon cleared up, and the period of invalidism was measured by weeks rather than by months as before. This treatment was very successful, and no case of secondary haemorrhage occurred. Indeed, secondary haemorrhage was only met with in one case, and in that instance aspiration had not been used. No re-accumulation of fluid followed.

Infected Haemothorax.

Infection occurred in 25 per cent. of the cases; it arose from the lung in 20 per cent., and from the exterior in 80 per cent. In such cases removal to the base was advisable towards the end of the first week, otherwise valuable time was lost. Only by an examination after exploratory puncture could a definite diagnosis be made. Sometimes the patients were very ill, but this was not always true at first. With anaërobic infections symptoms closely simulating haemorrhage occurred, and also with this infection a cracked-pot note was obtainable by percussion. Cases with streptococcal infection were usually very seriously ill, and contralateral pleurisy was more commonly met with.

Pneumothorax.

He spoke very briefly of pneumothorax. It was very uncommon in this connexion in his experience. Only 12 examples were diagnosed in nearly 500 cases, and its

presence was proved in only 4. It was almost always right-sided, perhaps because the left-sided cases were fatal before the patients were transferred to the base. He thought that good results had been obtained by aspirating the air-containing space first, and opening the pleura afterwards, when the lung had partly expanded.

Pathology and Bacteriology.

Captain H. Henry, R.A.M.C., spoke of the pathology and bacteriology. He said that his data had been derived from three sources: (1) *Post-mortem* examinations in 100 cases; (2) routine laboratory examinations of the fluids removed, and (3) experiments upon animals. It had to be remembered that his investigations concerned a particular group of cases—those which arrived at the base hospitals. In 6 of the fatal cases death was due to injury to the vertebrae and spinal cord only. Of the remaining 94, 78 had haemothorax and 16 had not. In only 8 at most of the cases with haemothorax was death due to simple bleeding; the remaining 70 were complicated—26 cases by damage to viscera, and 44 by sepsis. Captain Henry then described the typical *post-mortem* appearances of fatal cases of haemothorax. He said that primary coagulation of the effused blood and a deposition of fibrin occurred in a few hours. Afterwards exudation followed, which induced secondary clotting. The lung submerged in the extravasated blood collapsed; the stages of this collapse were more rapid and its degree more complete than occurred with pleural effusion. The unsubmerged part of the lung was voluminous from the high grade emphysema which affected it. The line of demarcation between the haemothorax below and the emphysema above varied greatly in obliquity. The shifting over of the mediastinum and its contents was due at first to the collection of blood, but later to inflammatory change after it had become encysted. In septic haemothorax, the pleura and lung became covered by a secondary generation of fibrin, which, moreover, might spread throughout the pool of blood. In anaërobic infection the haemothorax often had a foul odour, but this was not constant. Sometimes there was little evidence of infection in the haemothorax itself, and search had to be made further afield, as on the pericardium, etc., to reveal it. The naked-eye appearances of the fluid were no guide as to the presence of sepsis, nor was the nature of the cellular constituents. Anaërobic organisms and streptococci accounted for the great majority of the infections.

Experiences in England.

Lieutenant-Colonel W. Hale White said that in his experience if the patients were well enough to be sent to England they usually progressed favourably. He had seen some fifty, none of which ended fatally. In a large number of cases of bullet wounds of the chest the patients suffered little from their effects. The dyspnoea seen in many cases was altogether out of proportion to the physical signs. He thought that in some cases it was at least partly "functional" in origin. Haemoptysis was an uncommon symptom of the condition as seen in this country. It had not recurred except in one case. He had been struck by the fact that after the fluid had been aspirated in haemothorax the heart did not return to its normal position. It was difficult to give an opinion as to when aspiration should be performed; he thought that certainly every case in which the fluid amounted to over 20 oz. should be so treated. A point which was often forgotten was that the chief trouble was connected with the collapsed lung, and the patient was not instructed as to the manner by which it could be re-expanded. It was a question whether this should be by breathing exercises or by short walks uphill.

Dr. Murray Leslie thought a great advance had been made in the attitude adopted towards aspiration in haemothorax. It was very different from that which was in vogue during the South African war. He endorsed Colonel Hale White's remarks as to the importance of breathing exercises or walking uphill to re-expand the lung.

Mr. Cortlandt MacMahon, in describing exercises suitable for such cases, said that the main objects were: (*a*) To prevent pleural adhesions forming, and to break down existing adhesions by careful and gradual movements; (*b*) to enable lungs which had collapsed to regain their normal condition; (*c*) to reduce haemothorax and pneumothorax; (*d*) to restore the normal shape of the chest walls, which had fallen in owing to collapse of the lungs; (*e*) to assist the discharge of pus by increasing lung inflation; (*f*) to improve the general condition by the tonic effects of the exercises, and especially to overcome breathlessness on exertion. The procedure on which he laid greatest stress was that the body should be bent laterally away from the side of the injured lung; the uninjured lung being thereby partially collapsed, the lung on the injured side was made to inflate more definitely. To help this inflation a pressure of 30 lb., increased to 60 lb., was put upon the uninjured side by the operator's hands and the abdomen made to contract with the breath held.

Dr. F. J. Poynton referred to cases of wound of the chest with, perhaps, some fever, the cause of the illness being obscure. He spoke of the importance of not being in a hurry in such cases to resort to surgical treatment. Caution was an important factor in the treatment of such chronic cases, which often cleared up with a little patience.

Captain Morriston Davies, R.A.M.C.T., also spoke.

THE SOLDIER'S HEART.

At a meeting of the Section of Pharmacology and Therapeutics of the Royal Society of Medicine held on January 18th, the President, Lieutenant-Colonel W. Hale White, being in the chair, Sir James Mackenzie opened a discussion on the soldier's heart. His paper, and that of Dr. McN. Wilson who followed, are published at pages 117 and 119.

Dr. Poynton thought that at present a broad view was the most helpful. He pictured a group of symptoms predominantly cardiac, prone to arise in presumably healthy men at a vigorous time of life under the exigencies of military service. He thought the causation was complex, and would consider the following points: (1) Latent infection; (2) the cases which seemed to him classical; (3) the importance of prevention; (4) nerve shock and strain, and the possibilities of recovery; (5) hyperthyroidism; (6) heat-stroke.

1. *Latent Infection.*—This view had been again insisted upon in a recent memorandum by Drs. Cotton, Lewis, and Thiele, describing the discovery of streptococci and staphylococci in the urine of such cases. As indirect support, he would state that a streptococcus obtained from acute rheumatic cases could experimentally produce cardiac failure, with or without notable dilatation, and from the urine of these animals the streptococcus could be recovered. In man also there was a group of rheumatic cardiac cases in which, without endocarditis or pericarditis, the heart wall was weakened, and his study of them led him to see in such many of the symptoms observed in soldier's heart. It was clear, if the suggestion of these writers was established, that to the already well-known causes of latent infection there would be added an important group which for the moment he would term "septic."

2. Nevertheless, latent infection did not appeal to him as furnishing the really classical examples; these he had seen, during the ten years preceding the war, in privates in the Guards regiments. They were adolescents of great stature and with big frames, usually a little anaemic. The symptoms commenced early in their training. At first there was great fatigue at the end of the day; then thumping of the heart at night occurred, then dyspnoea and palpitation on exertion, finally a "fall out" on march, dead beat, or a sudden syncope with or without slight convulsion. The thumping, ineffectual heart beat was very evident in these cases. He did not believe that latent infection was a factor, though he could not prove this. He looked upon the cardiac weakness as either congenital or much more frequently acquired. The large unconsolidated frames had outstripped the cardiac development. Strain was produced by limited diaphragmatic excursion and hard physical exertion carried on with needful routine. Tobacco and possibly beer were adjuncts. Indigestion was frequent and nervous symptoms were soon superadded.

3. The importance of the possibility of latent infection at present was very great. We had a large number of

convalescent cases of dysentery, enteric, and other infections now, and presumably they might form the nucleus of an army of "soldiers' hearts." Fortunately, an unforeseen remedy had appeared. These infectious cases required elaborate tests, and the time taken over them gave us splendid opportunities for controlling these most rash of convalescents until they had shaken off their weakness, and braced their potential "soldiers' hearts." The lines of treatment, if infection was made the predominant factor, were clear, and were preventive—namely, (*a*) accurate histories; (*b*) treatment of obvious foci of infection in tonsils, teeth, etc.; (*c*) patience in the convalescent stage of infections. When a case was in the broken-down stage, rest and a progressive forward policy in exercise were essential. His opinion was that a man with a severe breakdown, though eventually recovering, would not see active service again in this war. For what he called classical cases he would again from his experience emphasize prevention. Were we careful enough of young, overgrown recruits? Barrack life could not be converted into a preparatory school, but he would venture to submit that some tactful form of supervision on routine lines would be valuable. When symptoms occurred he took an unfavourable view of severe examples of this group, and believed they would not make soldiers.

4. *Nerve Shock and Strain.*—He looked upon the heart as so intimately connected with the nervous system that in considering heart strain he could not clearly differentiate the muscular and nervous symptoms. In this group he put nerve first, muscle second; in the preceding, muscle first, nerve second, but both were involved. He had seen striking cases from shell shock, and should like to hear what the section thought of their prognosis. One case of his bore on this. An officer at Ypres developed, after shell shock, these cardiac symptoms, and was treated, with progressive improvement, by the speaker for some months. Eventually, without his knowledge, the officer returned ten months later, and in his first heavy fighting collapsed at once with all his old symptoms aggravated. Dr. Poynton's views on their treatment mostly coincided with those of previous speakers. "Short of fatigue" was the keynote to exercise, but he did not, except from the point of view of research, favour the grouping together of these cases either in wards or in convalescent homes.

5. He attached importance to the suggestion of hyperthyroidism, seeing that it introduced a new line of treatment in the shape of *x* rays, but he wished to learn the right perspective, for his personal experience was against the frequency of this explanation, though he was absolutely open to conviction.

6. Lastly, heat-stroke was an obstinate and difficult factor in some of these cases, and in his opinion their outlook unfavourable. In the group due to nerve shock and strain, a cheery doctor, a minimum of complete rest, cheerful companionship, with pleasing exercise short of fatigue, and time, were his mainstays. Drugs which corrected dyspepsia, and were gently soothing to the nervous system, were useful.

Dr. R. W. MICHELL said that when the soldiers suffering from heart symptoms were removed from the front he had found that the cases of right ventricular failure settled down, whilst those with the "irritable heart" did not. He could corroborate the occurrence of an intense feeling of suffocation. It was very real and accompanied by change in the patient's colour and shrinking of the skin, and was followed often by the passing of a large quantity of urine, even as much as two quarts at once. There was often tenderness with a dilated heart, but none with the "irritable heart." The patient became very sensitive to the action of his own heart. The first result of exercises was to fix the chest, not to expand it, and a stage was soon reached in which the chest became immobile and the respirations were entirely abdominal. Dr. Mitchell thought that this limited movement of the chest was connected with the production of an irritable heart. As, in spite of the great stress and mental strain of work in the trenches, comparatively few soldiers developed heart affection, he did not attach much importance to these factors. He believed, however, in the influence of poisons and of exhaustion.

Dr. P. HAMILL thought the condition described by Sir James Mackenzie a very definite one. Most cases could be traced back to some undue exertion during some febrile disorder. The proportion of cases in which a history of antecedent diarrhœa could be obtained was very large. Electrocardiograms failed to demonstrate any primary heart disorder. Any little excitement caused such hearts to beat at a rapid pace. The condition was very liable to relapse. As to the treatment by moderate exercise, fresh air, and pleasurable surroundings, he quite agreed with Sir James Mackenzie. Briefly, the heart was strained whilst in a partly poisoned condition, but a psychological factor in the causation must not be lost sight of. The severely affected hearts were probably damaged permanently, but whether this were so it was for the next generation to decide.

Dr. ALEXANDER MORISON said that he was entirely in accord with Sir J. Mackenzie as to the methods by which such cases should be treated. There was nothing amiss with the size, rhythm, or mechanism of the heart, yet the patients were incapable of the usual amount of exertion. It occurred among the young and those of a neurotic type. Any disturbance which arose was attributable to the nervous system; there was no evidence of primary cardiac disorder. The utmost caution was required in attempting to foretell what would happen to such cases. He thought that the chances of such patients being afterwards of use as soldiers were negligible.

Dr. O. LEYTON thought it possible to distinguish cases in which the heart muscle was affected from those in which the vasomotor system was chiefly at fault, by noting the ratio of intensity between the basal and apical sounds. In cases in which the heart muscle was much affected by toxic causes he had noted a difference in the ratio from the normal. In others, complex in origin, when the vasomotor system was at fault, there was no change in this ratio.

Dr. FLORENCE STONEY thought that the associated signs showed that "irritable heart" was one of the symptoms of Graves's disease. The activity of the thyroid gland could be regulated to any required extent by *x* rays, and the condition could thereby be cured. A tendency to thyroid derangement occurred in families, and this derangement followed on the overstrain and toxic influences to which these patients were subjected. It was important at the commencement of treatment to give attention to the possible influence of pyorrhœa. The improvement obtained by *x*-ray treatment was slow in some cases, but astonishing in others.

Dr. T. R. BRADSHAW said that in not a single case which he had seen at the Western General Hospital among soldiers who had been sent back as suffering from valvular disease of the heart had he detected a murmur. It was unfortunate that the diagnosis of valvular disease should be made if there was any doubt, for when known to the individual it affected his whole career. The questions of importance were whether these men would again become efficient soldiers or become fit for home service. If there was no prospect of their returning to duty they should be invalided out of the service.

Dr. BEZLY THORNE said that the condition was not confined to soldiers, but was met with commonly in civilian practice among children and adolescents, and it sometimes persisted until middle life. He had ventured to name it cardio-vascular atony. He believed that the cause was toxic in the great majority of cases, but the patients could be made well without bacteriological treatment. A difference which he had noticed in the condition as it occurred amongst soldiers who returned from the trenches was that they showed more fibrillary tremor of the fingers and were more jerky. He considered the Nauheim treatment, especially the baths, valuable; in about two months in every case the patient was restored to permanently good health.

PROFESSOR GIUSEPPE SANARELLI, the distinguished Italian hygienist, has been appointed editor of the *Avvenire Sanitario*, a journal which has done good work in the promotion of sanitary reform and in the defence of the interests of the medical profession.

COUNT DELLA SOMAGLIA, president of the Italian Red Cross, has set up a central propaganda committee in Rome to make known to the public what it is doing in the war, and enlisting active sympathy and co-operation in the work. Affiliated committees have been formed in the principal cities of Italy.

Reviews.

RADIUM AND X RAYS.

Colwell and Sidney Russ, in publishing a book on *Radium, X Rays, and the Living Cell*,[1] state that their object is to describe some of the main experimental facts which have been established as to the effects of the *x* rays and the rays from radium upon living cells. When innumerable papers are appearing day by day in medical journals all over the world (a few scientific, but by far the larger proportion merely personal records of cases and results), it is well to have a clear and lucid account of the chemical and physical properties of these radiations, and a rational exposition of their effects on living cells, with a scientific explanation of the manner in which these effects are brought about. With these objects in view the authors have produced a work which should do a great deal towards placing *x* ray and radium therapeutics on a more scientific basis than has hitherto been possible. In the first chapter an important point is emphasized in dealing with the measurement of *x* rays, a point which is by no means commonly known even amongst so-called experts. The change of colour in a prepared pastille is a common method of measuring an *x*-ray dose, and yet by a simple experiment this method can be shown to be very inaccurate. The authors point out that a "soft" tube in a certain time will change the pastille to the standard tint; then harden the tube, readjust the primary current, and a new pastille suffers the same colour change in the same time. The dose, as measured by the two pastilles, is the same, yet the clinical effects upon the tissues, seeing that the tube condition is quite different in the two cases, must be profoundly different. The early chapters on *x* rays, secondary *x* rays, the transmission of *x* rays through matter, the ionization effects, and other similar matters should be of great value to *x*-ray therapeutists. They are followed by chapters on the radio-active substances and their emanations, written on similar lines. Dealing with the standard of radio-active quantity, it is pointed out that the maché unit has been much abused by its too general use, and that its use for cases other than that for which it was originally intended—namely, the measurement of very small quantities of emanation in waters—is to be deprecated. Part II starts by describing the chemical action of radium and of *x* rays, and then follow chapters on the effect upon certain low forms of animal life. The diagrams showing the restriction of development following radium irradiation of the ova of triton are remarkable; a description of the histological examination of a human fetus after exposure to *x* rays is of great interest. Next we have the results of experiments on the growth of plants and of bacteria, and note that the authors have omitted to refer to the experiments carried out by Abbe. The latter part of the book, well illustrated by reproductions of photomicrographs, deals with the histological changes brought about in various organs, such as the skin, the blood and the blood vessels, the various glandular structures, the nervous system, and other tissues. A full account of the changes in malignant cells follows, and emphasis is laid on the fact that the administration of the type and intensity of the radiation most appropriate to any particular growth is a matter of great difficulty. The data may at present be insufficient for any sure basis of radio-therapy, yet a large number of facts are being gleaned which should render this possible in the near future. Short chapters on the production of malignant disease by the rays, idiosyncrasy and dosage, the physiological effects, and the selective and differential action of rays, form the concluding part of the work. Two features add to the value of the book—namely, that a very complete bibliography follows each chapter, and that the authors in each section have placed side by side the chapters on radium and *x* rays. This method of arrangement makes it easy to follow and to compare results, and adds greatly to the value of the book for reference.

Many textbooks, large and small, have been published on radiography during the past twenty years. It is not saying too much in praise of Dr. Robert Knox's book, entitled *Radiography, X-Ray Therapeutics, and Radium Therapy*,[2] to describe it as being the best which has as yet been published on these subjects in the English language. The first part deals with *x*-ray diagnosis; the chapter on instrumentation and technique is very complete, and if any criticism is to be made on the general scope of the book, it would be that perhaps too much space has been allotted to this part of the subject. The whole field of *x*-ray diagnosis is admirably dealt with, and there are singularly few, and these somewhat unimportant, omissions. For the student the very clear description of diagnostic possibilities will be very valuable, and the short descriptions of methods and technique which precede each chapter add to the value from this point of view. The chapters which describe the application of the method to the thorax, the stomach, and the kidneys are of special merit. The illustrations of this division of the book are very good. A feature of them and an innovation in *x*-ray illustration, is that side by side are shown reproductions of the plate and the print from the plate, of the same radiographs. The artistic merit of the reproductions is very high, and this double method of showing *x* rays is of value as a help to learning to read *x*-ray pictures. A further good point is that common and everyday radiographs are reproduced, and not those of rare and unusual conditions. The chapter on the localization of foreign bodies is well and clearly written. It deals with the simple and more useful methods, but this part of the book, owing to the importance the subject has at the present time, might with advantage have been extended. Part II, which deals with *x* ray and radium therapy, is practical, and whilst describing the scope of treatment in a large number of diseases, is restrained and critical as regards results. This part of the subject is well illustrated by photomicrographs of pathological interest, and numerous photographs of cases before and after treatment. The concluding portion, on radium physics, written by Phillips, is altogether admirable, as it possesses the two great merits of lucid description and simple language. The medical practitioner will find this a useful book of reference, and the beginner in *x*-ray work a valuable textbook.

NEUROLOGY.

The first edition of Church and Peterson's well-known American textbook of *Nervous and Mental Diseases*[3] came out in 1899. The eighth edition, now before us, preserves the character of the previous editions, and has been brought up to date by what the authors describe as "one hundred and fourteen sizable interpolations" and over two hundred minor alterations. The first 626 pages of the book are by Dr. Church and give an account of nervous diseases divided into eight sections. In one of these, headed "Diseases of the Nervous System without known Nervous Anatomical Basis," are included a number of pathological conditions, such as myxoedema, exophthalmic goitre, tetany, and various forms of dyspituitarism, that are now generally recognized to be disorders connected with abnormalities in glands with internal secretions. This section also contains a chapter on what Dr. Church calls the "Infection Neuroses"—namely, tetanus, hydrophobia, and chorea—which are said to be "not marked by known changes in the neural apparatus." Such views may perhaps be characterized as unduly conservative and in need of revision. In his account of the bacteriology of chorea (p. 561) Dr. Church gives only four references to the literature of the subject, the latest dated 1899. At the end of the volume Dr. Peterson gives an account of mental diseases extending to 230 pages, clearly written, concise, and well arranged. The book is well printed, the illustrations are good, and there is an adequate index at the end of the volume. It is well written, not unduly abstruse or scientific, and devotes a good deal of space to the important subject of treatment throughout. It may be recommended to medical practitioners and students who are in search of a sound practical textbook of diseases of the nervous system.

[1] *Radium, X Rays, and the Living Cell.* By H. A. Colwell, M.B.Lond., D.P.H.Oxford, and S. Russ, D.Sc.Lond. London: G. Bell and Sons, Ltd. 1915. (Med. 8vo, pp. 334; 61 figures, 2 plates. 12s. 6d. net.)

[2] *Radiography, X-Ray Therapeutics, and Radium Therapy.* By R. Knox, M.D.Edin., M.R.C.S.Eng., L.R.C.P.Lond. The Edinburgh Medical Series, General Editor, J. D. Comrie, M.A., B.Sc., M.D., F.R.C.P.E. London: A. and C. Black, Ltd. 1915. (Roy. 8vo, pp. 426; 64 plates, 245 figures. 25s. net.)

[3] *Nervous and Mental Diseases.* By A. Church, M.D., and F. Peterson, M.D. Eighth edition, thoroughly revised. Philadelphia and London: W. B. Saunders Co. 1914. (Roy. 8vo, pp. 940; 338 figures. 21s. net.)

Dr. CAMPBELL THOMSON's book on *Diseases of the Nervous System*,[4] now in its second edition, gives a clear and fairly brief account of the subject that should be of great utility to the medical student. The subject matter is divided into six sections, of which the last, dealing with diseases of the brain and diseases of general origin, occupies nearly half the book, and illustrates the fact that the classification of the diseases called nervous is far from having reached finality. Dr. Thomson writes clearly and concisely, and the illustrations, many of them taken from cases in his own practice, serve excellently to illuminate the points at issue. The text is well up to date, and there is a good index. We can recommend the work to practitioners and students of medicine who are in search of a sound and tolerably short manual of nervous disorders.

Six years ago a review of the excellent textbook of nervous diseases edited by Dr. CURSCHMANN was published in the BRITISH MEDICAL JOURNAL (1909, ii, 987). The book was well up to date, complete from the point of view of the German literature of the subject, and well illustrated. An authorized English edition of the work, edited by Dr. C. W. BURR of Philadelphia, has now been issued.[5] The translation has been done tolerably carefully, and has been lightened or diversified by the introduction of a number of American colloquialisms and slang terms. The text is not free from misprints, for example, "Tringeminus," on p. 23, should be "Trigeminus"; "polyneuritis psychosis," on p. 168, should be "polyneuritic psychosis"; on p. 481 "a diadocokinesis" should be "adiadochokinesis"; the oft-quoted names of "Wickmann" and "Déjérine" should be "Wickman" and "Dejerine." The German original contained 289 illustrations in the text; these have been cut down by Dr. Burr to 246, and appear with their German notation, where such notation is, in the English translation. Not a few of the blocks from which they have been printed seem to be unduly worn. It does not appear that anything has been done to bring the book, originally published in the summer of 1909, up to date. Even in the account of acute anterior poliomyelitis—a disease that has been so brilliantly investigated by Flexner and other American workers during the last few years—we look for a mention of Flexner's name in vain.

GUY'S HOSPITAL REPORTS.

THE editors of *Guy's Hospital Reports*[6] inform the subscribers, in their preface, that though many of the articles in the present volume were already in print by August, 1914, their publication has been delayed, every member of the staff of Guy's Hospital having been so fully engaged with extra work arising directly or indirectly out of the needs of the sick and wounded, that little, if any, time has been available for the writing of papers or reports. Dr. Pembrey contributes an excellent article on the advantages of physical games over gymnastic work. He argues that there is a medicinal flavour in set exercises—some are called nutritive, others corrective, and others depletive—but most of them cause undue fatigue, lack interest, and are monotonous. On the other hand, resistance to disease is increased by the outdoor life associated with games, and in the long run it is cheaper to provide playing fields than gymnastic instructors. Dr. Pembrey admits that games may have one serious drawback, and that is when they are played for notoriety or gain, and not for pleasure. Mr. Higgins contributes an interesting and amusing paper on charlatans and "miracles." Drs. Eason and W. Johnson write on four cases of pituitary tumour, and the volume includes some other clinical and scientific contributions. We must congratulate Mr. C. H. Golding-Bird on his very complete obituary notice of Thomas Bryant, the last link that bound the modern school of surgery in Guy's Hospital to that of Astley Cooper, Key, and Birkett. Beyond the limits of the Borough, Thomas Bryant was best known when in his prime for his textbook on surgery, much needed in the seventies, as Mr. Golding-Bird rightly reminds us.

[4] *Diseases of the Nervous System.* By H. Campbell Thomson, M.D Lond., F.R.C.P. Second edition, revised and enlarged. London: Cassell and Co., Ltd. 1915. (Cr. 8vo, pp. 570; 120 figures. 10s. 6d. net.)

[5] *Text-book of Nervous Diseases.* Authorized English edition, edited by C. W. Burr, B.S., M.D. In two volumes. Philadelphia: P. Blakiston's Son and Co. 1915. (Roy. 8vo, pp. 1158; 246 figures. 12 dols. net).

[6] *Guy's Hospital Reports.* Edited by F. J. Steward, M.S., and Herbert French, M.D. Vol. lxviii, being vol. liii of the Third Series. London: J. and A. Churchill. 1914. (Demy 8vo, pp. 225. Terms to subscribers, 6s.; to non-subscribers, 10s. 6d.)

NOTES ON BOOKS.

A THIRD edition of the popular little work by Sir PARDEY LUKIS and Lieutenant-Colonel BLACKHAM has appeared under the slightly changed title of *Tropical Hygiene for Residents in Tropical and Subtropical Climates.*[7] The text has been carefully revised, enlarged, and brought up to date. Among the matter added are a full description of hookworm disease and its prevention, a dissertation on goat's milk and undulant fever, and two entirely new chapters—the first dealing with the sanitation of camps in the tropics, the second with hydrophobia. In their preface the authors state that the second edition was exhausted in less than a year. This, better than anything, speaks for the popularity of the work, and this edition, just as the previous one, can heartily be recommended.

Lieutenant-Colonel BIRDWOOD'S laboratory manual for students of tropical medicine[8] and practitioners in hot countries has now reached its second edition. It contains eighty-nine short chapters, each giving precise numbered directions how to carry out such operations as blood-staining, blood-counting, vaccine formation, examination of urine, and the like. It is based on the author's extensive experience in the teaching of Indian students, and appears to contain all that is required, in an easily assimilable form. The book is interleaved with plain paper, so that notes may be added as required. The first edition of the book was exhausted in a year; we wish the second an equally rapid and happy exit.

The address delivered at the University of Leeds Medical School on October 1st, 1915, by Sir WILLIAM OSLER, Bt., on *Science and War*, was noted in the JOURNAL for October 16th, 1915, p. 572. It has now been published in the form of a pamphlet[9] by the Clarendon Press, and may be warmly commended to the attention of general and medical readers.

[7] *Tropical Hygiene for Residents in Tropical and Subtropical Climates.* By the Honourable Surgeon-General Sir Pardey Lukis, K.C.S.I., V.D., and Lieutenant-Colonel R. J. Blackham, C.I.E., R.A.M.C. Third edition, revised and enlarged. Calcutta and Simla: Thacker, Spink, and Co. London: W. Thacker and Co. 1915. (Cr. 8vo, pp. 302; 52 figures. 4s. 6d.)

[8] *Clinical Methods for Students in Tropical Medicine.* By G. T. Birdwood, M.A., M.D., D.P.H., Lieut.-Colonel I.M.S. Second edition. London: W. Thacker and Co. Calcutta: Thacker, Spink, and Co. 1915. (Pott 8vo, pp. 260. Rs. 2.8.)

[9] *Science and War.* By Sir W. Osler, Bt., M.D., F.R.S. Oxford: The Clarendon Press. 1915. (Demy 8vo, pp. 39. 1s. 6d. net.)

MEDICAL AND SURGICAL APPLIANCES.

Plates for One-armed Men.

DR. A. E. SHIPLEY, Master of Christ's College, Cambridge, has devised a couple of plates for the use of soldiers and sailors who have lost an arm. One is a soup plate, with a depression in the centre, from which the last two or three spoonfuls of soup can easily be removed. The other is a plate for solid food, which has vertical sides and an overhanging rim; against this pieces of meat or pudding can be pushed without any risk of their toppling over the edge

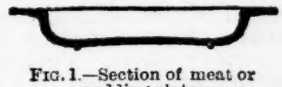

FIG. 1.—Section of meat or pudding plate.

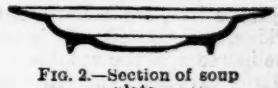

FIG. 2.—Section of soup plate.

of the plate. "For convenience of commerce," Dr. Shipley continues, "it has been suggested that the plates should be named, and 'Unimanus' has been suggested (Cf. Livy 35, 21 and 41, 21), but it seems simpler and certainly shorter to call them 'manchot' plates," *manchot* being the French word for a one-armed man. The plates are being made by Messrs. Goode, 16, South Audley Street, London, who are solely responsible financially and have consented to devote rather more than 20 per cent. of the profits to the Serbian Relief Fund.

MEDICAL REGISTRATIONS AND MEDICAL STUDENTS IN 1915.

We referred briefly last week to some statistics issued by the President of the General Medical Council showing the number of medical practitioners whose names had been added to the *Medical Register* in 1915, and the number of medical students registered in the same year. The following is the detailed statement showing the number in each of the three kingdoms in 1915, and the annual average during the previous five years:

Medical Practitioners Registered.

	In 1915.	Annual Average during the Five Years 1910–14.
England	863*	 591
Scotland	412	 384
Ireland	251	 197
Total ...	1,526	 1,172

Medical Students Registered.

	In 1915.	Annual Average during the Five Years 1910–14.
England	754	 620
Scotland	694	 517
Ireland	470	 304
Total ...	1,918	 1,441

* This number includes 269 practitioners with colonial and foreign qualifications.

These statistics will give much food for thought, and we confess that at present their meaning is not clear.

The increase in registrations of practitioners is remarkable, in that after all deductions are made it is above the average. The increase in registrations in England is partly to be accounted for by the large number of practitioners registered with colonial and foreign qualifications. In 1914 the number was 77, this year it is 269. It would appear, therefore, that the number of English medical practitioners added to the *Register* by registration in England in 1915 was about 70 above the average during the five years 1910–14. In Scotland the number was 28 above the quinquennial average, and in Ireland 54. A large part of this excess is probably due to earlier qualification of fifth-year students anxious to join the R.A.M.C. The figures obtained from the medical schools by the President of the General Medical Council last year suggested that there was a shortage of from two to three hundred among fifth-year students. The policy adopted by the War Office, on the advice of the medical authorities, of requiring senior students who had enlisted in various capacities to return to their schools with the view of qualifying, is probably the chief cause that the expected shortage has disappeared and has been replaced by an actual increase. Altogether it may be estimated that, apart from practitioners registered with colonial and foreign qualifications, some 350 more practitioners were registered during 1915 than the figures furnished by the schools last year appeared to authorize us to expect. The return of the fourth-year student from the ranks will tell in the present year in a similar way. Pessimism, therefore, about the immediate future of the supply of medical men seems to be discounted.

With regard to the more distant future, matters are very much more uncertain. It is true that the number of medical students registered in 1915 is in all three countries in excess of the annual average during the five years 1910–14 (the total excess amounting to 477), but this increase has, we believe, occurred outside London, Cambridge, and Oxford. It is partly to be accounted for by the increase in the number of women students. Until the figures have been submitted to more detailed analysis it is impossible to say what proportion of the increase is thus to be explained, but probably the number of women students will not be found to exceed 200. This conclusion is perhaps confirmed by the increase in the numbers entering the Scottish, Irish, and northern English schools, which admit women students on the same terms as men. It seems safe to assume that the number of male entrants this year is at least 250 above the average for the five years before the war. In connexion with the preference shown for the northern schools, it may be noted that the Scottish student passes his preliminary examination in general education on the average about a year earlier than the southern English student, so that there are more first-year students under military age than usual. Parents are probably becoming conscious that the medical profession offers better prospects in the future than hitherto, but as they have to study economy send their sons or daughters to the medical school which is nearest and also less expensive. At the same time the figures as to the number of medical students registered in 1915 are open to the fallacy that though these students have registered they either already belonged to an officers' training corps, or will join one; hence, as was the case last year and the year before, very many are receiving commissions, and are therefore withdrawn from the actual study of medicine.

ROYAL MEDICAL BENEVOLENT FUND.

(Continued from page 97.)

The following is a continuation of the summary of cases relieved by the Committee at its meeting on December 14th, 1915:

Daughters, aged 64 and 66, of M.D.Leyden who practised in London and died in 1858. Applicants' only certain joint income £28, which they supplemented by taking in boarders. Owing to the war the boarders have entirely ceased and they are in difficulties. Helped by the Fund twenty-years ago. Voted £12 and the elder sister recommended for an annuity.

Widow, aged 63, of M.D.Dub. who practised at Cambridge and died in 1904. Applicant had managed to live by taking in resident pupils, but owing to the war has practically lost them all. Rent paid by relatives, but now in temporary difficulties, owing to the loss of above, and illness. Voted £10 and referred to two other organizations for help.

Widow, aged 58, of L.S.A.Lond. who practised at Bournemouth and died in 1913. Applicant was left totally unprovided for. Has a pension of £26 per annum from another society, and during the last year has only received £5 from lodgers. Health very unsatisfactory, and unable to let more rooms. Relieved once, £12. Voted £12 in twelve instalments.

Daughter, aged 53, of M.R.C.S.Eng. who practised in London and died in 1880. Applicant's health is very bad and she is quite unable to work. Lives with a widowed sister, who finds home but cannot do more. Relieved six times, £64. Voted £10 in two instalments.

Daughter, aged 58, of L.R.C.P.Lond. who practised at Brierley Hill and died in 1872. Applicant suffers from chronic ill health, and recently fractured her ankle. Only income an annuity of £35 from another charity, and a little help from friends. Relieved eight times, £53. Voted £12 in twelve instalments.

Widow, aged 54, of M.R.C.S.Eng. who practised at Yelverton and died in 1908. Applicant endeavours to make a living by taking in boarders, but does not get sufficient to make it pay. Relieved nine times, £107. Voted £12 in twelve instalments.

Widow, aged 42, of M.R.C.S.Eng. who practised in North Wales and died in 1910. Applicant was left quite unprovided for, with two children now aged 6 and 9 years. Has free rooms in return for services, and makes a little by selling goods on commission, but not sufficient to meet expenses. Relieved four times, £40. Voted £10 in two instalments.

M.R.C.S.Eng., L.R.C.P.Lond., aged 49, who practised in Lancashire and abroad. Applicant is married, with three children, now aged 9, 14, and 16 years, and he has become totally blind. Wife and children are cared for by relatives. The applicant is now studying massage in London, and hopes shortly to be qualified and earn his living. Only income £12 per year from a charity for the blind, and a little from friends. Relieved once, £10. Voted £10, and referred to the Guild.

Daughter, aged 49, of M.R.C.S.Eng. who practised at Gillingham and died in 1911, and was for some years an annuitant of the Fund. Through ill health the applicant not able to earn her living, and receives her food in return for looking after a child during the day. Has to pay rent for her room. Relieved twice, £17. Voted £12 in twelve instalments through the Guild.

Widow, aged 64, of M.B.Glasg. who practised in South Wales and died in 1913. Applicant's only income £16 per year, and her three children, all married with families, unable to help. Health very bad. Relieved three times, £24. Voted £12 in twelve instalments.

Daughter, aged 56, of M.R.C.S.Eng. who practised at Rotherhithe and died in 1879. Applicant is suffering from chronic glaucoma, which prevents her from working as a nurse. Only income from investments and friends £24 per year. Relieved seven times, £67. Voted £12 in twelve instalments.

Widow, aged 59, of L.R.C.S.Edin. who practised on the West Coast of Africa and died in 1907. Applicant has two sons who are abroad and unable to help, and one daughter, aged 36, who is an invalid, lives with her mother. Applicant has recently broken her ankle, and is incapacitated from doing any work. Only income a little occasional help from friends. Relieved four times, £48. Voted £12 in twelve instalments.

(To be continued.)

British Medical Journal.

SATURDAY, JANUARY 22ND, 1916.

TWO SCORE AND FIVE TO THREE SCORE AND TEN.

THE duty of medical men of military age and capacity—that is to say, those under 45 and physically fit—is now well defined, and the personal letter addressed by the Central Medical War Committee to all such men who have not yet applied for a commission, printed in the SUPPLEMENT for this week, and the scheme of the Scottish Medical Emergency Committee, published in the SUPPLEMENT for January 1st, explain the steps each should take. What are the duties of medical men over 45 years of age at this crisis in their country's need?

This question has hardly been mooted as yet; but the time appears to have arrived when some attention should be directed to the subject. From time to time it has been pointed out that war is a "young man's game," and catastrophes have occurred showing the unwisdom of the elderly Territorial officer whose *esprit de corps* and sense of patriotism have led him to volunteer for service abroad with his unit rather than to make way for a younger man. The duty of the medical man over 45 years of age lies in this country. If he is between the ages of 45 and 55 and physically fit, if he can be easily spared from the work in which he is engaged, and wishes to take uniformed service, it is open to him to apply for a commission in the R.A.M.C. for home service only. Though for the moment there is not much evidence that large numbers of such men for home service are required, yet it seems quite clear that the development of home service by those above military age forms one of the methods by which the strain on the civilian community and the difficulties of younger men, who may lose everything by joining the army, may be met. There must be a large number of men between 45 and 55 whose worldly position makes the sacrifice of some portion of their practice comparatively easy, whose work could be managed by their less fortunate brethren, and whose temporary withdrawal would not unduly affect the medical attendance on the community in which they live. When organization is sufficiently advanced, there should be an opportunity for employing these men as commissioned officers at home, thereby setting free younger commissioned men for service at the front, and possibly relieving from military duty some younger men who cannot well be spared. There can be little doubt that shortly a register of men between 45 and 55 must be made, and they must be enrolled. But they must remember that they will be required to engage for whole-time service, and be willing to be sent to any part of this country where their services are required.

The position of those medical officers of Territorial general hospitals described in the *Army List* as "available for service on mobilization," but often spoken of as *à la suite*, is exceptional. These hospitals were organized before the war as parts of a general scheme of the medical service of the Territorial Force, and the members of the staffs were commissioned under conditions which do not preclude them from continuing their private practice or from attendance at the local civil hospitals, of the staffs of which they may also be members. The large increases which have been made in the number of beds in the Territorial general hospitals have in many instances rendered it necessary to take up buildings at such distances that certain members, in some instances we believe the majority, are in fact, if not in theory, altogether withdrawn from private and civil hospital practice. Further, part-time work is obtainable in many areas by men who are employed as "civil medical practitioners" without a commission; the opening for this class of work is limited at present, but it is not unlikely that further developments will become necessary.

With regard to those for whose services in any military capacity there is, by reason of age, no demand, there are two directions in which the path of duty needs mapping out: First, there is the need of making every effort to set free younger men for service; and, secondly, of taking care that those who join the army suffer as little loss as possible in consequence of their patriotism. In both these matters there is much that should be impressed upon the medical profession. Quite a number of the older men feel resentment because they are not employed in some military or semi-military capacity. They appear to think that they are being prevented from doing their duty to their country. Yet if they would only bear in mind that the military need is for younger men, and that the setting free of a younger man for service is of far greater value than paying visits to convalescent soldiers, they would find work of the highest importance. They should enter their names with the local Medical War Committee as willing to carry on the practices of absentees; wherever possible they should register themselves with the Central Medical War Committee as willing to act as locumtenents for as long a time as they can be spared from their own work; they should assist in the formation of central clinics, bureaux, or dispensaries in any area where the local committee adopts these methods for meeting the shortage of doctors; they should agree to canvass younger men and to show them how their interests can be safeguarded, wherever there seems to be any reluctance on the part of the younger men to enrol. And in the matter of safeguarding the interests of those on service there is much that needs recognition. It is not enough to agree to attend a particular man's patients for some reduced fee. It should be acknowledged that the patients of every man who has left his practice to join the army are no longer available for increasing the connexion of the man who remains at home. In every case in which a new patient presents himself for treatment it is the duty of the practitioner consulted to inquire who was the former attendant. If the patient was under the care of a man who is now serving, and if the patient for some reason declines to go to that doctor's substitute, then the practitioner newly consulted should make it clear that he only attends in the capacity of substitute; that the attendance is for the duration of the war only; and, if possible, that all accounts will be rendered by the representative of the absentee. Such a plan is perfectly workable, except, perhaps, in the case of practices among the very poorest class, in which individuals seem to change their doctor so frequently that it is impossible to decide whose patients they really are. Unfortunately, it happens that the lay community is by no means alive to its responsibilities in the matter. It is for those who remain behind in medical practice to see

that a proper view is instilled into the minds of the public, and not to permit, under any conditions, injury of the interests of those who are risking their lives as well as their fortunes.

Some of the suggestions we are now making have already been put forward in these columns. There is evidence that they have not yet fully borne fruit; and hitherto the Central Medical War Committee has been so greatly occupied in more urgent work that it has not, perhaps, been able to emphasize its opinions on matters affecting primarily the profession itself. Medical men have responded nobly to the call, but a further response is required. The call to serve with the army has now to be made on those whose difficulties in responding are possibly greater than in the case of some of the earlier recruits. It is for those whose age unfits them for active service to recognize in what directions they may best take a hand in providing the services with the medical officers required.

SERUM TREATMENT OF BACILLARY DYSENTERY.

As long ago as 1907 Kruse and Shiga independently proposed the use of serums made from the bacilli known by their names for the treatment of dysentery, and good results were said to have been obtained. In later years, however, so many other species of bacilli have been found to produce symptoms of bacillary dysentery that it has become necessary, in the absence of definite bacteriological research, to use serums called polyvalent made from several varieties of such germs. In 1910 Ruffer and Willmore prepared such a polyvalent serum, the constituents being the following bacilli: (1) Shiga-Kruse No. 1; (2) El Tor No. 1; (3) pseudo D. (Kruse); (4) Flexner, including pseudo A. (Kruse); and (5) some as yet unidentified strains. At the same time a monovalent serum against the *Bacillus dysenteriae* El Tor No. 1 was made also. In using these serums for treatment the general practice of the authors was to give an initial dose of 40 to 60 c.cm. in mild cases, of 80 c.cm. in severe cases, and of 100 to 120 c.cm. in desperate cases. These doses were repeated as required, as much as 320 c.cm. being given in twenty-four hours. The injections appeared to have a beneficial effect, manifested in from four to twelve hours after the first injection. In all cases the most striking phenomenon was the improvement in the patient's general condition; the pulse became fuller and slower, the heart sounds of better quality, the temperature fell to within normal limits, and abdominal pain disappeared. A remarkable effect upon the patient's mental condition was observed also. These striking changes in the general condition were not usually accompanied by a corresponding improvement in the character of the stools, which often became more abundant and fetid and contained more sloughs; the number passed, however, was usually diminished.

In 1913 Willmore and Savage gave a short account of the treatment of 227 cases in which the presence of bacillary infection was demonstrated. In this series it was often noted that the patient exhibited marked improvement for a few hours following the injections, only to relapse again when presumably the effect had worn off. In such cases the injections had to be repeated until the improvement became permanent. Between November, 1912, and January, 1913, the number of pilgrims that passed through the quarantine station at El Tor was 16,551. Of these 75 were admitted into hospital with dysentery and 9 died. Out of 26 cases in which bacillary dysentery was present, 22 were treated with serums, with 2 deaths, a mortality of 9 per cent. The percentage of deaths among pilgrims in Egypt attacked by dysentery has been reduced since the introduction of serums from 53, and even from 70, to 12.

Similar satisfactory results have apparently been obtained in Japan and Fiji, as well as in France, Russia, and Germany. The notes on the treatment of diarrhoea and dysentery issued by the Advisory Committee for the Prevention of Epidemic Diseases in the Mediterranean Force[1] say of the serum available for the force that there is no doubt that in many cases it is of great value, and that the earlier it is given the better; a dose of 20 c.cm. administered by subcutaneous injection is, as a rule, sufficient, but, if deemed necessary, as much as 60 c.cm. may be given at the outset, or the smaller initial dose may be repeated. Shiga is responsible for the statement that since the introduction of anti-dysenteric serum the case-mortality from bacillary dysentery has fallen from 35 per cent. to 9 per cent. Many serums are now to be obtained, including those of Kruse, of Shiga, of the Lister Institute (Todd), and of the Pasteur Institute (Vaillart and Dopter). Shiga's rules for the administration of his polyvalent serum are: In mild cases to inject one dose of 10 c.cm.; in cases of medium severity to inject two doses of 10 c.cm. at intervals of six hours; in severe cases to inject 10 c.cm. twice a day, at intervals of six hours, for two or three consecutive days. Castellani and Chalmers state that a polyvalent serum, such as that of Shiga, is to be preferred for the treatment of cases in which a complete etiological diagnosis of the malady cannot be made. The serum, in their experience, should be given in large doses—that from the Pasteur and Lister Institutes in 20 c.cm. doses twice daily, and in very severe cases four times daily. The injection can be made intravenously or under the skin of the abdomen or flank, using ordinary aseptic precautions. Such injections, they believe, as a rule need not be continued after the second or third day. In some instances the injections cause a slight rise of temperature or even urticarial-like eruptions and pains in the joints. According to their experience the serum has a marked effect upon the disease, hastening the cure, ameliorating the symptoms, and reducing the mortality.

Other observers have not perhaps met with such good results, and it is a fact that there are cases in which the serum appears to fail. The cause of these failures may quite well be that the individual case of the disease is due to some species or strain of bacillus not contained in the serum that has been used. This is a possibility which must not be lost sight of.

Again, it is quite possible that in the past amoebic cases may have been so treated, as well as cases of diarrhoea and bowel troubles not necessarily connected with dysentery, and the Mediterranean "notes" from which we have already quoted say that "in cases of doubtful etiology there should be no hesitation in employing a combined therapy of emetine and polyvalent serum." The diagnosis of the various forms of dysentery is not easy, and until this has been put on a more scientific basis much confusion must necessarily exist as to the treatment most suitable for each individual type. On the whole, however, the bulk of the evidence is in favour of the use of serums in bacillary dysentery. It is important that records should be carefully kept of all cases so treated, as the statistics so obtained will be of the greatest use in the future.

[1] *Journ. R.A.M.C.*, November, vol. xxv, p. 478.

THE SOLDIER'S HEART.

THE war has emphasized the importance both of an appreciation of the physiological variations in the action of the normal heart and of a knowledge of the means by which temporary or slight cardiac disturbances may be distinguished from those of greater moment. The subject is one on which opinions vary widely, and in which finality has not yet been attained. Knowledge of cardio-pathology has increased so rapidly during the last few years, and so largely by the employment of technique which is beyond the reach of most, that it is not surprising that by some medical examiners recruits have been rejected or soldiers invalided for reasons which subsequent examiners have considered inadequate.

To meet these difficulties as far as may be, a memorandum was drawn up by Sir James Mackenzie and circulated by the War Office to those whose duty it is to examine recruits. This memorandum, which was published in our issue of October 16th, 1915, enjoins the need for gauging the functional efficiency of the heart by ascertaining how it responds to effort. Physiological murmurs, it states, are always systolic in time, and it advises that murmurs should be held to be negligible if the candidate's response to effort is normal and his heart is not increased in size. After assuming that irregularities indicating serious disorder would be associated with such diminution of the functional efficiency that their possessors would not seek to recruit, it deals more particularly with two other forms of arrhythmia—"the youthful type" and that accompanied by extra-systoles. The former, which varies with respiration, is regarded as of no importance since it occurs with perfectly healthy hearts. The latter should lead to the candidate's rejection only if the heart's efficiency is impaired and its size abnormal. It is also pointed out that during examination those who are perfectly healthy may suffer from palpitation or excited action of the heart, the beat becoming forcible and rapid; sometimes a systolic murmur may be heard. If such a candidate be told to lie down and breathe slowly and deeply for a few minutes the cardiac action becomes less violent and the rate slows during expiration. Contributions from subsequent writers showed that the data laid down in this memorandum were not entirely acceptable to all.

A study of "soldier's heart," or "the irritable heart of soldiers," approaches the subject from another standpoint, and was the basis of a discussion held at a meeting of the Section of Pharmacology and Therapeutics of the Royal Society of Medicine on January 18th, to which Sir James Mackenzie and his collaborator, Dr. R. McN. Wilson, contributed the opening papers. The disorder attracted much attention during the American Civil War, and was exactly described by Henry Harthorne in a paper published in the *American Journal of Medical Sciences* in 1864. In the same year the British Government appointed a committee to inquire into the heart conditions prevailing in the army. It sat for five years, and came to the conclusion that the form of accoutrement then in vogue, by restricting the heart's action, caused its "irritability." One of its recommendations was that the principle of the brace should be adopted, and this was afterwards acted upon, but the irritable heart remained. Another theory, initiated by Surgeon Arthur Davy in 1876, has proved equally fallacious. In his opinion "setting up" drill was the cause. It acted, he said, by over-expanding the chest and thus dilating the heart. But, as Dr. Wilson points out, cases are now met with among soldiers who have had little or no drill in circumstances where this cause could be excluded.

The observations of Sir James Mackenzie and Dr. Wilson suggest that the malady should be regarded in an altogether different light. They have examined about 400 soldiers who have been certified and treated as having heart affections. In their opinion, in at least 90 per cent. of these the heart is not primarily at fault, and the treatment suitable for them is widely different from that appropriate for patients suffering from heart failure. They consider the condition one of general exhaustion, and the circulatory symptoms but evidences of a general state. In the majority of the cases the onset of the exhaustion was found to be connected with an infection; in a few, a history of a very strenuous life preceding the symptoms was alone obtainable. These observers make a clear distinction between the symptoms arising from infection of the heart and from cardiac failure on the one hand, and those of the "poisoned" heart, as they term the "irritable heart" of soldiers, on the other. The principles of the treatment which they recommend are a natural corollary of this conception of its etiology: they are directed to increasing the general health of the body in such a way as to increase the natural resistance to infection, to eliminating toxic influences, and to bracing up the patient bodily and mentally. They therefore advise fresh air in plenty and judicious exercise in the fresh air, and disapprove of the way in which such patients are often kept in bed for long periods under depressing circumstances. That exercise should be selected which gives the man most pleasure, and should be indulged in so long as it causes neither distress nor discomfort. It is clearly of great importance that this view of the nature of "soldier's heart"—a view with which the sense of the meeting was in general agreement, though several speakers attached importance to the existence of hyperthyroidism in a certain proportion of cases—should be known to medical officers in order that the soldier may be safeguarded from the depressing effect which a diagnosis of "heart disease" engenders.

WAR PENSIONS.

THE first meeting of the Statutory Committee of the Royal Patriotic Fund Corporation constituted by the Naval and Military War Pensions Act, 1915, was held at St. James's Palace on January 17th, under the presidency of the chairman, the Prince of Wales, who, in opening the proceedings, said that the Committee was empowered to deal with the pensions and allowances granted not only to those who had been engaged in this, the greatest war the world has ever seen, but also to their wives, their families, their widows, and dependants. The Committee would be able to deal sympathetically with the cases of widows and dependants who might need more individual treatment than could be given under the necessarily somewhat rigid system of Government departments. The Committee was not only authorized to supplement in exceptional cases the scale of State pensions, but also to take into consideration the position of dependant persons not hitherto recognized by the State. Another class to whom the sympathy of the whole nation went out, and who might count upon the hearty consideration of the Committee, were those who in the prime of manhood and vigour of health had been permanently disabled. They would receive substantial pensions from the State, but the duty of the Committee would be to initiate schemes of training and means of finding employment for them, so that they might be enabled to feel that they were still active members of the community. The Committee contains representatives of

many of the voluntary associations which have already done so much to ensure the sympathetic treatment of the families of men with the colours and of the widows and orphans, and the Prince expressed the hope that they would cordially co-operate with the Committee. Much quiet unselfish work had, he said, been done since the beginning of the war by thousands of men and women to make certain that, as far as possible, men fighting our battles should be free from anxiety as to the well-being of their families at home, but it would be the duty of the Committee to see that this good work was adjusted and developed. The Prince concluded by intimating that it would not be possible for him during the continuance of the war to carry out fully his duties as chairman, and in fact he returned to the British army in France on the following day, but he expressed his confidence that the vice-chairman, Mr. Cyril Jackson, could count upon the loyal and implicit confidence of all the members. Afterwards the Committee appointed three subcommittees: organization and general purposes (8 members); finance (6 members); pensions, grants, and allowances (12 members). The chairman, vice-chairman, and Mr. Hayes Fisher, Parliamentary Secretary to the Local Government Board, will be *ex officio* members of all committees. Mr. Hayes Fisher informed the Finance Committee that the Chancellor of the Exchequer would recommend Parliament to place a State grant of £1,000,000 sterling at the disposal of the Statutory Committee. Until a secretary is appointed, Lieutenant-Colonel Alfred Welby, Secretary of the Royal Patriotic Fund Corporation, will act, and in the meanwhile the work will be carried on at the offices of the Corporation, 17, Waterloo Place, S.W., where all letters should for the present be addressed.

GRANTS TO UNIVERSITIES AND UNIVERSITY COLLEGES.

THE Board of Education has issued in two bulky volumes its report for the year 1913–14 on those universities and university colleges in Great Britain which are in receipt of grants from the Board. The grants to English universities and colleges for the financial year 1913–14 amounted to £149,000, and those to the three colleges in Wales to £25,500. The volumes also contain reports from other universities and constituent colleges of universities in receipt of aid. Among these are included for the first time reports from the Medical Department of the University of Cambridge and the Medical School of St. Bartholomew's Hospital (University of London). Owing to the war the issue of these volumes was delayed by the pressure of work caused by the absence of many members of the Board's staff either serving with the military and naval forces or temporarily transferred to other departments, and the Board does not intend to publish volumes of reports for the year 1914–15. From the beginning of this year the influence of the war became more and more disturbing, and it was soon clear that the teaching centres would suffer severely from the decrease in the number of students. In the autumn of 1914 preliminary inquiries were made to ascertain the extent of the financial loss which might be anticipated, and as a result the payment of a special grant to university institutions was recommended. The Treasury, recognizing the justice of these claims, made provision accordingly in the estimates for 1915–16. It is hoped that in this way something may be done to prevent any permanent decrease of efficiency of university education. But it cannot be denied that the war has inflicted irreparable losses on education, and that the year 1913–14 will for a long time to come represent the high-water mark of educational achievement in this country. The report is therefore of more than usual interest, as it relates to the last academic year before the outbreak of the war. During the past year the vital dependence of industry upon the higher branches of scientific research has been very clearly shown, and it is recognized that university institutions will play a great part in providing the scientific needs of industry on a scale calculated to put this country on equal terms with the best-equipped rival. The Board has recently put forward a scheme for the organization and development of scientific and industrial research. Under this scheme a Committee of the Privy Council, responsible for the expenditure of the funds provided by Parliament for the purpose, has been established, and also an Advisory Council responsible to the Committee of Council and composed mainly of scientific men with knowledge of industries dependent on research. Sir William McCormick is Administrative Chairman of the Advisory Council and also of the Board's Advisory Committee on University Grants, so that it is hoped to ensure harmony of action between the Research Council and the Universities Committee. Attached to the report are numerous tables showing the income, expenditure, and number of students of the various teaching centres, which are divided into two main groups, according as they are in receipt of "Exchequer" grant, or of grants not falling under this heading. To this latter category the Cambridge and St. Bartholomew's medical schools now belong. In England the income of institutions in receipt of "Exchequer" grant showed an increase in this last year before the war of over £6,000 from fees, an increase of more than £5,000 from endowments, and an increase of nearly £5,000 from grants by local authorities. The expenditure of institutions in receipt of "Exchequer" grant in England showed a rise of about £18,000. The total expenditure of the medical schools in London, excluding St. Bartholomew's, showed an increase of £3,000 over the previous year. The cost of maintenance of premises fell by £1,000, while the expenditure on teaching, salaries, and laboratory maintenance rose by £4,000. In England the total number of full-time students in institutions receiving "Exchequer" grant numbered 7,756, as compared with 7,666 for the year 1912–13, the increase being equivalent to 1.2 per cent. of the total. It was due to a marked rise in the number of university students, for there was a fall in the number of training college students. The total number of part-time students showed an increase of about 300. The number of full-time students at institutions not in receipt of "Exchequer" grant (and for this calculation the statistics for Cambridge and St. Bartholomew's were not available) had risen from 1,810 to 1,921. The medical schools in London showed an increase of 95, the London School of Medicine for Women leading with an increase of 34 students. It is interesting to find that while the number of students of arts and pure science in England had continued to fall, the number of students in medicine, engineering, technology, and agriculture had risen, the rise being greatest in medicine. In two years the total number of medical students had increased by 283, or nearly 11 per cent. In 1912–13 this increase was practically confined to the medical schools in London. In England the percentage of students admitted under 17 had decreased from 4.9 to 3.2; in Wales, however, it had risen from 1.6 to 2.9.

INHALATION OF STONE DUSTS.

THE Explosions in Mines Committee has issued a report[1] by Dr. J. S. Haldane, F.R.S., on the effects of inhaling dusts applicable for stone dusting in coal mines. In previous reports experiments bearing upon the effects of inert dusts in preventing or limiting explosions in coal mines were detailed, and while it is impossible to say to what extent the use of incombustible dust will render explosions impossible, there is a belief that the number of explosions will thereby be diminished and their violence limited. Questions, however, have arisen as to whether the distribution of such fine dust as silica may not be

[1] Cd. 8122. Price 2d.

injurious to the lungs of the miners. Professor Beattie, of Liverpool, has found that the dust of argillaceous shale is innocuous. Since the publication of his report Mr. A. Mavrogordato has carried out fresh experiments which confirm the opinion. If there is danger at all it is more likely to come from flue dust, and this should certainly be interdicted. The amount of pulmonary phthisis among the tin miners of Cornwall is still far too high. Their death-rate compares most unfavourably with that of coal miners. It is inadvisable, therefore, to introduce into a coal mine any form of dust which, while possibly preventing explosions, might yet become a cause of pulmonary disease. The dust of uncombined crystalline quartz has been found to be dangerous. In fact, it is to the presence of quartz in the gold mines of South Africa that the large amount of silicosis in the Transvaal is attributed. The granite cutting industry also is an unhealthy occupation, owing to the fact that granite contains quartz and the silicates mica and felspar. In steel grinding it is difficult to say how much of the lung disease is due to the steel and how much to the grindstone. Animal experiments have shown that intense exposure to dust produces fibrosis of the lungs, and later on there is always the possibility of tubercle becoming engrafted upon the affected lung. The opinion is expressed that shale dust when inhaled is no more deleterious than coal dust, but that under all circumstances it is well to reduce to a minimum the inhalation of dust of all kinds.

HOSPITAL CONSULTATIONS AND THE PRIVATE PRACTITIONER.

THE Massachusetts General Hospital is about to open a consultation clinic for the benefit of people of limited means. On two days in the week, the *Boston Medical and Surgical Journal* states, patients referred by their own doctors will be received in the out-patient department for "consultation and diagnosis only." Doctors are requested, if possible, to accompany their patients. When a practitioner is unable to do this he will be expected to send a letter referring the patient to the hospital. The doctor will in due course be informed as to the diagnosis made, and treatment will be suggested. An admission fee of £1 will be charged. When an *x*-ray examination is needed an additional fee of 8s. to 12s. will be charged. For certain other laboratory tests charges not exceeding 4s. will be made. This covers any further visits which may be necessary for a diagnosis. The result of this experiment will doubtless be closely, and even jealously, watched. Our Boston contemporary, while admitting that "judged by a conservative standard it is an encroachment by the hospital upon the territory of individual physicians," says that "from a more enlightened point of view it is a further step towards improving the service which the medical profession as a whole renders the public." The beneficial effect "will not be due to successful individual diagnoses alone. It will follow, later on, that people will demand more accurate diagnoses, and the application in their own cases of some of the more scientific diagnostic methods such as they or their friends have seen employed at the hospital." The Boston journal thinks it improbable that the clinic will injure the general practitioner. "He will be aided in his management of the case; and, if the disease is one which he is unsuited to treat, the sooner he learns that fact the better for his reputation." This seems to us a somewhat Olympian way of regarding an innovation which may have very far-reaching social and professional consequences. There are, of course, certain obvious advantages to the practitioner in the scheme if it is worked by the hospital staff in a spirit of professional loyalty. If he goes to the clinic with his patients these visits will help to keep him abreast of the progress of knowledge. But great care will be necessary if friction is to be avoided, and the scheme is doomed to failure unless his cordial co-operation is secured.

INDUSTRIAL LIGHTING.

THE lighting of factories and offices—which will in due course be the subject of legislation based on the recently published report of the Home Office Committee—is at present in a transition stage. Until quite recently local illumination held the field, but there is now an increasing tendency to abandon the lamp over the individual machine or desk, and to substitute powerful light sources with suitable reflectors placed high up near the ceiling. This plan has the advantage of avoiding inconvenient shadows, although local lighting is still essential in a comparatively small number of cases where the work is of a specially delicate or complicated character, or where, in the manipulation of fabrics, a great deal depends upon the play of light and shade. In clothing factories local lighting is already being widely replaced by general illumination, and in one of the very latest factories, now working on khaki material, general lighting with half-watt lamps has been adopted. One circumstance which has helped to bring general lighting into favour in factories is the simplification of machinery and the diminution of shafting and belts owing to local electric driving. Overhead shafting renders general lighting impracticable, owing to the interruption and flickering caused thereby. One point which was brought out in the course of the discussion on this subject at a recent meeting of the Illuminating Engineering Society was the supposed physiological preference for local as against general lighting. The Chairman, Mr. F. W. Goodenough, said that in cases in which the work demanded concentration of attention for long periods the workers found it restful to glance up from their brightly illuminated surfaces to the subdued surroundings. The lighting in the sorters' department of the General Post Office has been modified in response to a demand of this kind on the part of the men. The physiological basis of this problem, however, is still obscure, and requires further study. Another point of importance which was insisted upon by the opener of the discussion, Mr. J. S. Dow, was the value of reflected light from the surroundings. This reflected light is most useful in strengthening the illumination in parts of the room furthest from the lamps and keeping it above the minimum necessary for safety. In addition to this, it is now recognized that most objects cannot be completely seen unless they are illuminated from many different directions, and in some American factories the floor and non-moving parts of the machinery, as well as the ceiling and walls, are painted in a light colour.

THE MEDICAL EXAMINATION OF RECRUITS.

ATTENTION has been called to an article which appeared in the *Sunday Chronicle* for January 9th, headed "£80 a Week," stating that a number of correspondents had written to the editor enclosing cuttings from newspapers which state that in the last big rush of recruiting many doctors charged 2s. 6d. for each recruit examined, and that in some cases individual doctors were charging as much as £80 a week. After some gratuitous remarks about the attitude of doctors towards the Insurance Act, the editor adds, "It seems that the Government had a short way with these gentry, and cut down their charges to a maximum of two guineas per day." Some of the correspondents are said to have waxed sarcastic at this exhibition of "patriotism," and asked if these particular medical men have any right to criticize Welsh miners or Clyde engineers, and the editor of the *Sunday Chronicle* says in reply, "We do not think they have the right, but are quite certain that they will be very prominent in exercising it." In the issue of the *Sunday Chronicle* for January 16th a letter appears signed by Dr. Joseph Jones of Leigh, Lancashire, pointing out that it is all nonsense to talk about doctors charging £80 a week,

as they knew quite well beforehand what the rate of payment was and the maximum for any day. As was stated in these columns last September, the rate paid before the war was 2s. 6d. a man, but when recruiting on a large scale began in September, 1914, it was arranged that the total paid should not exceed 24s. for any one day. Since March 12th, 1915, the rate paid in most, if not all, commands is on a sliding scale. For one to four men it is 2s. each; for five to nine it is 10s.; for ten to nineteen 20s.; for twenty to twenty-nine 30s.; and for thirty men or more 40s., which is the maximum. The sum allowed to county associations for the medical examination of recruits of the Territorial Force is 1s. a head. Dr. Jones in his letter points out that doctors have at times during the rush of recruiting been in attendance at the recruiting offices from the opening in the morning until 11.30 p.m., not because they expected to be paid, but because they knew the country wanted the work to be done, while at other times doctors have hung about the recruiting offices all day and only had perhaps one or even not one recruit to examine. In a note to this letter the editor says: "It is a fact that some doctors sent in accounts for £50, £60, or £80, for examining recruits during the last week of the Derby scheme. Our correspondents only referred to these particular cases and made no imputation at all upon the patriotism of the general body of medical men. If they had done we should not have published their letters." It would, perhaps, have been better to have ascertained the facts with regard to the authorized scale of payment. The medical examination of recruits is thankless work, and though it may be well to correct evident mistakes, the doctor-baiters are perhaps best left severely alone to pursue their hobby.

Medical Notes in Parliament.

The Central Medical War Committee.

MR. TENNANT has made written answers to three questions by Mr. Shirley Benn (January 12th). The first question was why the medical profession is not starred, since a doctor represented a skilled worker who was not easily replaced and whose training occasioned considerable outlay and occupied a long period of time. Mr. Tennant's reply was: Special arrangements have been made with regard to the recruitment of the medical profession with a view to ensuring all adequate attendance on the troops without unnecessarily dislocating the medical needs of the civil population. The question of starring does not arise.

The second question was, under whose authority the Central Medical War Committee, now occupied in recruiting doctors to the Royal Army Medical Corps, was chosen; by whom were its powers defined; what were those powers; and by whose nomination had its members been selected.

Mr. Tennant replied as follows: The Committee referred to in the question was, I am informed, appointed, and its terms of reference settled, by the British Medical Association at its Annual Representative Meeting in July last; it was not confined to members of that Association, and the Committee co-opted five additional members representative of universities and colleges and of other medical bodies. One of the members of the Committee, being a member of the War Office Medical Advisory Board, was named by the Director-General to represent the Army Medical Service on the Committee. The terms of reference are as follows:

> To organize the medical profession in England, Wales, and Ireland in such a way as will enable the Government to use every medical practitioner fit to serve the country in such a manner as to turn his qualifications to the best possible use; to deal with all matters affecting the medical profession arising in connexion with the war; and to report to the Council (of the British Medical Association).

After a conference at the War Office with the Director-General of the Army Medical Service, the Committee was informed on August 9th, 1915 (in a letter which has been published) that the Director-General hoped to receive from the Committee much help in his work of providing officers for the Royal Army Medical Corps, and was glad to recognize the Committee as a medium for dealing with the great problem which faced the medical profession—namely, how to supply medical officers for the forces and at the same time to protect the needs of the civil population; and the Committee was accordingly authorized to make appeals to the profession with the object of securing these needs.

A further conference took place at the War Office with the Director-General of Recruiting on November 5th last on the same subject, and to the same effect. As a result of these conferences, this Committee, which has local committees in all parts of the country, has been endeavouring to procure and to co-ordinate offers from members of the medical profession of service in the Royal Army Medical Corps. Applications for such commissions are decided upon by the War Office after they have been referred to this Committee for consideration in relation to the medical needs of the civil population in the area concerned in each case, and after consultation with the Insurance Commission and, where necessary, with the Local Government Board and the Board of Education. Analogous arrangements exist in regard to Scotland. I should add that the War Office have received, and are receiving, very valuable assistance from these committees.

Mr. Benn's third question was whether the Government had sanctioned the recruiting, through the agency of the Central Medical War Committee, of medical men up to the age of 45, the limit of age for the rest of the nation being 41. Mr. Tennant answered as follows: The age limit referred to in the question relates to medical men applying for commissions in the Royal Army Medical Corps, and not to recruits for the combatant services in which the age limit of 41 applies.

War.

Medical Students.—Mr. Tennant, in a written reply to Mr. Shirley Benn (January 12th), who asked as to the risk of cutting off at its source the supply of medical aid both for the army and for the civil population incurred by recruiting first and second year medical students, has stated that the present policy was undertaken after most careful consideration. He added that the statistics bearing upon the matter were being further examined.

Recruits Physically Unfit.—Several questions have been asked with regard to the disposal of recruits found physically unfit. Mr. Tennant stated on January 12th that men already rejected for military service or discharged from the army on account of wounds or ill health who presented themselves for attestation would be included in the number of medically rejected. Such men, if they had not thought it necessary to attest, would not be called upon to serve in any event if their physical disability still rendered them unfit for any form of military service. On January 13th Mr. Tennant said that he hoped shortly to be able to state what arrangements it was proposed to make to give some distinctive badge to men discharged from the army as medically unfit.

Hammer Toes.—On January 13th Colonel White asked whether a considerable number of young soldiers were pronounced unfitted for drafts or were discharged from the service owing to their suffering from hammer toes or similar disability, and whether he would consider the advisability, in the less aggravated cases, of having these men fitted with surgical boots which might render them fit for service, in any event with a non-combatant unit. Mr. Tennant said that in the opinion of his medical advisers the issue of surgical boots to the men mentioned was not likely to render them fit for service; even if such boots were issued it would be quite impossible to replace them if they were lost or worn out on service.

Discharges for Physical Incapacity.—In reply to questions addressed to him by Mr. Hogge (East Edinburgh), Mr. Currie (Leith Burghs), and others, in regard to men discharged from the army with disease alleged to have been contracted before enlistment, Mr. Tennant has stated that each case is judged on its merits, the fullest consideration being given to each by the Commissioners of Chelsea Hospital and the army medical authorities. The suggestion that all disease subsequently manifesting itself in a man who had passed the doctor as a recruit should be regarded as due to military service could not be accepted. It was not possible for the military department to take responsibility in the case of men who had not contracted

illness in the service of the State, even if they had passed the medical examination when recruited. It was possible that the disease might not then have been detected; there might have been previous illness. Asked by Mr. Currie with regard to the case of men who had some latent disease which emerged owing to the hardships of military service, Mr. Tennant said that, speaking generally, it would be for the military authorities to state whether they considered that the actual service of the State had been the reason for the breakdown; if it had been, the man would receive the pension to which he was entitled. On January 17th Mr. MacCallum Scott asked whether officers holding temporary commissions invalided out by a medical board after serving during the present war would be liable to enrolment under the Military Service (No. 2) Bill, and whether single men honourably discharged on medical grounds from the army during the present war would be liable to enrolment under the bill. In reply Mr. Tennant said that individuals invalided out of the service, whether officers or men, would, *primâ facie*, be eligible for exemption under the bill.

Australian Medical Corps.—Captain Amery asked the Under-Secretary of State for War whether Lieutenant-Colonel J. W. Barrett, Australian Medical Corps, occupied the Imperial appointment of Assistant Director of Medical Services on the staff of the Director of Medical Services, Egypt, and consulting oculist to His Majesty's forces in Egypt; whether he was removed from these offices without inquiry by the Australian Government on a recommendation of the Army Council, which the General Officer Commanding in Egypt subsequently pointed out was due to a misunderstanding; whether a court of inquiry had been held, and what was the finding of that court; and whether, if that report is favourable, the Army Council is prepared to reinstate Lieutenant-Colonel Barrett, or whether he is prepared to make any statement with regard to the value of the work done by Lieutenant-Colonel Barrett. Mr. Tennant: I believe the facts as stated in the first two parts of the question are substantially correct. A court of inquiry was held in Egypt in October last year, and in its finding the court exonerated Lieutenant-Colonel Barrett, and spoke in the highest terms of his work. The High Commissioner of the Commonwealth was informed that there was no objection to Lieutenant-Colonel Barrett being employed in Egypt or elsewhere, provided the Government of the Commonwealth concurred.

Recruits' Eyesight.—Mr. Tennant has returned written answers to a series of questions by Sir John Rolleston as to the examination of recruits for defective vision. Mr. Tennant said that special ophthalmic surgeons were available in all commands, to whom would be referred all cases of doubt or difficulty, and cases in which it was thought that the defective vision could be corrected by glasses. The certificates of medical eye specialists were treated in the same way as certificates from any other medical men. They might aid the medical examiner of recruits, but could not absolve him from his responsibility in passing or rejecting the recruit.

Vaccination.—In reply to Mr. P. White, the Parliamentary Secretary to the Local Government Board, on January 13th, stated as follows: The number of successful vaccinations for which vaccination officers receive certificates at all ages in England and Wales was, in 1913, 430,470, and in 1914, 404,616, and the number of declarations of conscientious objection to vaccinations in 1913, 308,235, and in 1914, 321,313. I cannot give the actual number of children vaccinated, nor the figures for 1915, which are not yet available. It appears from the criminal statistics for the year 1913 that 146 persons were proceeded against in that year for offences against the Vaccination Acts. The statistics for 1914 and 1915 have not yet been published.

Madras Medical Council.—In reply to a question by Sir J. D. Rees as to the feeling alleged to be aroused among Ayurvedic physicians and hakims in the Madras Presidency by the action of the Madras Medical Council under the Madras Medical Regulations Act, 1914, in respect of Dr. Krishnaswamy Iyer's alleged covering of an Ayurvedic physician, and whether it was proposed to amend the Madras Act so as to bring it into line with the Bombay Medical Act, 1912, Mr. Chamberlain said that he had no official information on the subject.

THE WAR.

GENERAL AND STATIONARY HOSPITALS.

(From a Correspondent in Northern France.)

THE differences between casualty clearing stations and other hospitals are well marked; those between general and stationary hospitals may more easily be overlooked. In certain instances in France they are almost undiscernible. They do, however, differ as a rule very considerably in point of size, and in any case the theoretical or official distinction between them should not be forgotten by students of army medical administration.

Speaking metaphorically, it may be said that general and stationary hospitals are brothers, and the casualty clearing stations their distant cousins. Of the two brothers the elder is a portly citizen who lacks nothing that wealth can provide, and lives as a rule in the very best part, that is to say, at some military base. His guests, like himself, are supposed to be always persons of importance—in other words serious cases—and he is invariably prepared to receive at least 520 of them; also, whatever their number, he is able to provide them with all sorts of luxury in the way of up-to-date treatments. Finally, he is in a position to re-equip them completely in the matter of clothing; and, on the termination of their visit—if this has been a success—he can hand them over to one of his satellites, a convalescent camp. He is, in short, almost the military equivalent of a leading hospital in a medical centre at home.

The younger brother—the stationary hospital—often receives the same kind of guests, but is much less imposing in appearance. Even though he chance to be the immediate neighbour of his relative and to be really quite as well-to do, he maintains an establishment which is much less elaborate in point of equipment and also smaller (200 beds). Likewise he is supposed to be a person of more democratic tastes and hardier constitution. Consequently he usually lives in a poorer part than his brother. His natural habitat, in fact, is some spot on the lines of communication, where he can afford temporary accommodation for important persons or receive guests of a humbler sort, that is, men likely to recover from their wounds or sickness with rapidity, and whom it is consequently desired not to remove further than need be from their own units. His nearest equivalent in civil life is perhaps a county infirmary.

The third of the group is quite a different kind of person. A dweller in the byways, he recks little of appearances. Provided he has room for 200 guests and as many more as happen to arrive he is content with the mere necessaries of life in the matter of food and furniture and all other items. Many of his guests are more distinguished than any of those received by his cousins, but whatever their character he always passes them on to the latter as soon as circumstances permit.

All three are war-time institutions; in other words, they do not exist when the army is on a peace footing, but are ordered by the regulations regarding the Expeditionary Force (as revised and published in 1914) to be created on mobilization in the proportion of 2 general hospitals, 2 stationary hospitals, and 1 casualty clearing station to every division in the field. As the same regulations also direct that accommodation on hospital ships (220 cots per division) and on ambulance trains (room for 100 lying down cases per division) shall be simultaneously mobilized, it will be seen that the total accommodation provided is well over 10 per cent. of army strength.

This being the case, any one who has followed the debates in Parliament, and therefore knows the approximate strength of the British forces in France, can calculate for himself the vast total accommodation which the medical authorities in France would have been justified in raising had they chosen to act strictly in accordance with the regulations. Fortunately, however, for the taxpayer, for the medical profession, and for the civil population in Great Britain, this has not been their attitude. What they have done in reality is to comply, not with the letter of the regulation, but with its spirit. They have, in short, from beginning to end kept their accommodation in medical units of all kinds down as low as the position immediately in view seemed to justify. The enormous

economy thus effected in the way of personnel and all other directions will be realized only when and if the precise figures are published. For the present this, for obvious military reasons, is not likely to be done.

The immediate outcome of this attitude towards the general problem of how to secure that there shall never be any shortage of beds or other accommodation in France, without trenching too far on home resources, has been that instead of raising new general and stationary hospitals for every division that has arrived, the desired proportion of beds has more often been secured by expanding the accommodation of existing units.

This expansion has naturally not been level throughout, so there are a good many stationary hospitals whose accommodation is not obviously less than that of a general hospital. This is one circumstance which has tended to obscure the difference between the two types of institution, but there are others, perhaps of more importance. For example—the lines of communication are, practically speaking, quite short; it has been unnecessary to string out the stationary hospitals along them; they are commonly to be found at bases in the immediate locality of the general hospitals where they are housed on identical lines.

Another circumstance is the siege-like character of the military operations during the last fourteen months. This has enabled the medical authorities to avoid moving hospitals as frequently as would otherwise have been the case, so that many stationary hospitals have occupied the same site for many months; some for over a year. Their commanding officers have thus had time to beg, borrow, or steal all sorts of extra equipment and so bring up their hospitals to the level of a general hospital, both internally and externally. The zeal in this respect of the commanding officers, both of general and stationary hospitals—that is to say in regard to striving constantly towards perfection—is beyond all praise, and the hopeful spirit they exhibit is often quite remarkable. Many, for instance, start elaborate gardens, if they have any ground, around their huts and tents, and some have done so with much success. These things they do notwithstanding their consciousness that even if their hospital is not suddenly moved on elsewhere, they themselves may be transferred to another sphere of activity and leave the harvest to be reaped by a brother officer. Nor are such endings to their efforts by any means rare. It would sometimes seem, indeed, as if Nemesis kept a special watch for commanding officers who are too successful in the directions indicated.

A third factor is the importance that the medical authorities in France attach to the utilization of scientific methods. It has led to their gradually providing almost all stationary hospitals with annexes, such as the regulations would seem to imply shall be attached, as a rule, only to general hospitals—for example, *x*-ray departments, and often pathological laboratories.

A further circumstance which has had the effect of helping to eliminate the difference between the general and stationary hospitals in France is that some of the latter have been told off to do special work, and have thus acquired an importance which they would otherwise not have possessed. For instance, one stationary hospital began at quite an early date to deal exclusively with cases of infectious disease, and little by little has developed into an institution with nearly 1,000 beds. A second, which receives none but officers, has converted itself into the equivalent of a first-class nursing home; while a third, which has expanded despite the great success of its work, devotes its energies to the rapid restoration of their military efficiency to men suffering from venereal disease.

These are the circumstances which have mainly contributed to render the difference between general and stationary hospitals less discernible than it was in the first months of the war, and some of them have had a corresponding effect on the casualty clearing stations as a class. It is not common for any of these to remain in the same place very long, but some of them are housed in excellent buildings, and have managed to get hold of a sufficient number of bedsteads and other fittings to secure that at any rate one or two of their wards shall not be distinguishable from those of a stationary hospital of the more elementary kind. What is still more important, they all now include in their staffs members either of Queen Alexandra's Imperial Nursing Service or of the other nursing bodies which are now sharing its labours.

The net result is eminently satisfactory. There are few hospitals in France which could not give points to any of those which came into existence in South Africa during the last great war, and the general level in respect of the comfort of patients and of facilities for doing professional work of the best kind falls little if at all short of that of permanent civil hospitals in Great Britain.

Nevertheless, the official distinction between the three types of institution still remains, and should a general and prolonged advance take place it may be expected to become once more plainly visible. In other words, a casualty clearing station is officially only a hospital so long as it cannot pass its patients down the lines of communication; it is also expected to do this as quickly as possible, not keeping its patients longer than their condition renders imperative, or performing any operations other than those of necessity. Beyond mattress cases, it has little ward or allied equipment other than what it can carry in its own field panniers, and it is expected to keep ready to move at almost a moment's notice. Of this fact some commanding officers of casualty clearing stations remind themselves by keeping the motor lorries allotted to them within direct view and making a point of using them daily for some purpose or other.

Despite its name, mobility is also expected of a stationary hospital; for this, too, is a field unit. It possesses a good deal more equipment than a casualty clearing station, but its beds and bedding are only of barrack-room type, and it is self-dependent in the matter of medical comforts and surgery requisites. That is to say, it must carry everything it requires for any reasonable period in panniers, and it must never be surprised if asked to move on to some place at a distance from any centre at a notice of twenty-four hours or so.

The position of a general hospital, on the other hand, is considerably different. Its normal equipment is not essentially dissimilar to that of a civil hospital, and includes ordinary bedsteads, hair mattresses, bedside tables and the like, as well as plenty of surgical desiderata. It also has the advantage of knowing that if it is ever required to move it is likely to receive plenty of notice, and that in any case it will never be sent to a place at which it cannot obtain forthwith any stores or extra equipment that it may require.

All three types of hospital possess tents and marquees, but are expected to utilize permanent buildings if suitable ones be available.

TREATMENT OF ACUTE DYSENTERY.

At a meeting at Alexandria on October 17th, 1915, Surgeon-General Babtie, V.C., Principal Director of Medical Services Mediterranean Expeditionary Force, Egypt and Malta, being in the chair, a discussion took place on the treatment of acute dysentery.

Lieutenant-Colonel Sir Ronald Ross, who opened the discussion, after a short historical survey, drew attention to the relatively greater severity of the disease among the troops from Britain, Australia, and New Zealand compared to that among those from India. Emetine hydrochloride appeared to have proved very successful, but a certain percentage of cases remained refractory. Such were "running dysenteries," due probably to post-amoebic colitis. In older cases, especially of "running dysentery" not cured by emetine, he was still partial to ipecacuanha powder. Subsidiary treatment, oral and rectal, was by no means to be despised. Bismuth seemed to have proved distinctly useful. Oils appeared to be suitable on *a priori* grounds, and olive oil had for long been used extensively in Italy. Much difference of opinion existed as to the value of rectal injections in acute dysentery; in chronic dysentery they were often essential. He could testify to the value of hot hip-baths in cases with severe tenesmus. Regarding diet, his personal feeling was against too much broth, meat extracts, and eggs, and still more against large volumes of fluid of any kind, especially in "running dysentery." In conclusion, he pleaded that the complications should not be forgotten—chronic dysentery, often with stricture and a life of misery, and hepatic abscess. Rogers had found that in the British army in India more than 14 per cent. of cases developed the latter. (The report of Sir Ronald Ross's lecture before the Royal Society of

Medicine on December 20th, 1915, will be found in the BRITISH MEDICAL JOURNAL of December 25th, p. 927.)

Major McCARRISON, I.M.S., said that dysentery had accounted for slightly over 9 per cent. of the total Indian casualties from the Mediterranean. The mortality had been *nil*, and the cases had usually been mild. In a considerable number cure had rapidly resulted from rest, castor oil, or salines, and appropriate diet alone. Emetine had only been necessary for a minority. The majority of the cases were amoebic in origin. He was of opinion that large doses of emetine were not indicated; half a grain twice daily for one week, and once daily for a few days longer, was sufficient and safe. If the condition of the patient appeared to require its more extended use, it could be administered orally. He combined this treatment with a preliminary dose of castor oil and the subsequent use of salines or calomel, preferably the latter. Thymol or calomel, or, better, a combination of the two, were most effective in assisting in the disappearance of the cysts from the stools, and in dealing with carriers. Quinine injections did not destroy the cysts. Thymol should be given finely powdered and in doses of 30 grains daily. Oils, alcohol, vinegar, butter and ghee, being solvents of the drug, should be excluded from the dietary. With regard to diet, he emphasized the importance of resting the inflamed gut as much as possible; this rest was best secured by a diet consisting solely of tepid albumin water and water. Milk should only be given if the tongue were clean. Malaria and scurvy were frequent complicating factors among the Indian patients, and required their appropriate treatments. It should also be borne in mind that typhoid fever might complicate or simulate dysentery, and might render the diagnosis difficult.

Captain KERR, R.A.M.C.(T)., said that of 661 cases of dysentery under his observation 27 had died. Twenty-four *post-mortem* examinations indicated that the infection was amoebic in 20 and bacillary in 4. The stools of 565 cases of suspected dysentery were examined, and in 312 cases amoebae or amoebic cysts were found. Roughly 50 to 60 per cent. of the cases were shown to be amoebic. The routine treatment in cases of suspected dysentery had been to give a course of emetine (½ grain morning and evening for six to ten days, according to the severity of the symptoms and the result obtained). In many cases an initial dose of castor oil or salts was given. Afterwards, when the blood and mucus had disappeared, the stools being still loose, the emetine was stopped and a drachm of a bismuth salt was administered three or four times daily until the diarrhoea ceased. At the end of two to four weeks 2 or 3 more grains of emetine were given, or powdered ipecacuanha was continued for a week or two. Throughout the treatment the bowel was occasionally cleared by magnesium sulphate or castor oil. In more urgent cases, with excessive purging, collapse and exhaustion, antidysenteric serum (20 c.cm., repeated two to five times) was combined with the emetine and proved very satisfactory in many cases. It was frequently found necessary to employ intravenous saline infusions in addition. He was quite convinced of the great value of emetine, and administered it in normal saline solution by the deep subcutaneous method. Since extreme exhaustion followed severe dysentery, and heart weakness was common, prolonged rest in bed was essential. He advised that such patients as had gone through a severe attack of amoebic dysentery should be prescribed a monthly course of emetine (1 grain for three or four days) for a few months as a preventive measure against liver abscess. He did not favour lavage of the large bowel; it had not proved satisfactory in his experience. Rectal flushing did, however, ease those cases in which thick mucus was an urgent symptom. Appendicostomy had been of benefit in one case.

Lieutenant Colonel A. H. LISTER, R.A.M.C.(T.), said that at the hospital with which he was connected every case of dysentery received a four days' course of emetine injections (⅓ to ½ grain twice daily). After four days' interval a second similar course was given. If all straining or bleeding had been relieved the emetine was then stopped. He spoke of the great efficiency of the drug. Antidysenteric serum was employed if no improvement followed the emetine, 40 c.cm. being given subcutaneously, followed by 20 c.cm. next day. It had proved of definite value in a few instances, but its results were not uniformly good. Perhaps the cases which reacted were bacillary in origin, or the horse serum itself might have benefited the patients. Milk was excluded from the diet in acute cases, the substitutes being albumin water, whey, arrowroot, and barley water. It was thought advisable to exclude meat extract. Perhaps the outstanding feature in serious cases was vasomotor collapse, the systolic blood pressure falling to the seventies or even to the sixties in fatal cases. In some cases good results followed the subcutaneous infusion of one to one and a half pints of saline. Hypertonic saline infusions were more painful, and he was not sure that they were particularly advantageous. The infusion was combined with 10 minims of adrenalin solution (1 in 100) every four hours, injected hypodermically. Some cases were given brandy and champagne, some pituitary extract, some strychnine, but adrenalin appeared the most reliable. Pain was relieved by morphine and atropine given hypodermically. For tenesmus, after a dose of castor oil or enemata to empty the bowel of sloughs and débris, an enema of 3 or 4 oz. of warm olive oil containing a drachm of ichthyol was beneficial in some cases. An injection containing adrenalin and astringent was very successful in others. Castor oil (10 to 15 minims) or paraffin in half-ounce doses every few hours had been found of some service. For hiccough—a sign frequently of fatal significance—atropine had sometimes given temporary relief. For post-amoebic colitis bismuth and salicylates, astringents, chlorine water, and other antiseptics had been followed by uncertain results. Weak iodine, quinine, and silver preparations given by the bowel had only a qualified success. Careful dieting—for instance, the addition of curds or of soured milk, and of beaten-up eggs for the acute form, with the cautious trial of more solid foods, such as fresh fish or custard—was of real importance. Cereal soup might be of service. With this careful dieting, bismuth, liquid paraffin, and enemata of ichthyol and olive oil were used with favourable results. Many cases relapsed when taken off the special diet. When bleeding was serious adrenalin enemata, 1 drachm of the 1 in 1,000 solution to the half-pint of water, might be useful. Lime salts might be tried, and injection of horse serum seemed to have a good effect in exceptional cases. The possibility of a scorbutic element should not be forgotten. For the sequelae—asthenia, lassitude, backache, and tendency to recurrent diarrhoea—he was of opinion that convalescence would be hastened by change both of climate and of subjective outlook.

Major T. S. NOVIS, I.M.S., spoke of the value of 2-grain doses of ipecacuanha given every second hour with an equal quantity of tannic acid. He disagreed with the practice of giving 30 grains after a dose of opium, and the application of a mustard plaster to the epigastrium, because of its depressant effect and the continued vomiting it often produced. Intramuscular injections of emetine (½ grain) twice daily was the most successful treatment. He had seen very good results follow concentrated solutions of magnesium sulphate in cases presumably of bacillary dysentery, and in a few cases antidysenteric serum had been beneficial. The indications were rest and cleanliness of the bowel. The former could most nearly be obtained by starving the patient for two or three days and afterwards dieting with a food which left little residue. The bowel could be kept clean by large enemata of normal saline run in very slowly. Appendicostomy could scarcely be adopted for *acute* dysentery. Perforation was most frequent in the region of the caecum, and not uncommonly the extravasation became localized, necessitating drainage. After operation the edges of the wound might become gangrenous, a process which had been checked in a few cases by injection of emetine and the local application of carbolic acid. A course of emetine during or after convalescence would lessen the liability to hepatic abscess.

Captain F. OPPENHEIMER, R.A.M.C.(S.R.), had found that a very light diet was unsatisfactory. All but exceptional cases were put on such a diet as fresh milk, three eggs, custard, one pint of beef-tea, bovril or chicken broth, one pint of arrowroot or cornflour, clotted milk, cocoa for supper, and three lemons. The eggs were beaten up in the milk or, unless the patient were seriously ill, lightly boiled. Meat juices or extracts did not appear to aggravate the condition. After using sodium sulphate (3j hourly until a clear motion was obtained) he had abandoned it as

no improvement was observed and depression was caused. The practice was continued, however, in certain early bacillary cases. Enemata of quinine sulphate (1 in 2,000 to 1 in 500) had been used chiefly for the more severe amoebic cases. Such good results as had been obtained he attributed chiefly to their mechanical effect. When there was much tenesmus he usually followed this with a small starch and opium enema. He began by using emetine in half-grain doses twice daily for ten days. Since the amoebae did not always disappear from the stools he increased this period to fourteen days, using 1 grain daily in one dose. The results were very satisfactory. Later the course was increased to twenty-one days; three fatalities occurred. After intramuscular injections many cases had marked pain and stiffness two or three days later. From among about 3,000 injections about 30 cases had red and swollen arms, in one case a small slough formed, and in two suppuration occurred. Ipecacuanha had been used without favourable results as it was difficult to take effective steps to prevent vomiting. Quinine sulphate had been followed by some benefit in amoebic cases with a persistent high temperature, due to secondary intections of the colon. Dover's powders had been given freely at night to produce sleep and to relieve nocturnal diarrhoea. A stock mixture of bismuth, catechu and chalk had been used freely. For the griping pains he relied chiefly on hot fomentations and chlorodyne. The results obtained with serum in the bacillary cases had been good but not persistently so. Usually 50 to 100 c.cm. had been injected as an initial dose and followed by 40 c.cm. on alternate days for as long as appeared necessary. In the most severe cases the first dose was given intravenously. No ill effects had been observed. Intravenous hypertonic salines were very beneficial in collapsed cases.

Colonel TUBBY, A.M.S., thought that no surgeon could consider appendicostomy advisable during an attack of acute dysentery. He did not advise it in chronic dysentery; there was danger of peritonitis following, due to the lack of adhesions.

Lieutenant J. A. DELMEGE, R.A.M.C., gave a summary of observations on the treatment of 84 cases. Sixty per cent. were admitted during the second week of the disease, and 34 per cent. during the third week. Fifty per cent. were passing twenty motions in the twenty-four hours, with blood and mucus. For the remainder the average number of motions in the twenty-four hours was between eight and fifteen, with blood and mucus. All cases were treated with emetine intramuscularly (¾ grain on the first day, then 1 grain on each successive day). Forty per cent. were so treated till the total dose was 15 grains; 60 per cent. until it was 4 grains. No difference in the general condition of the two sets of cases was observed. A few complained of dryness in the throat, and 5 per cent. had vomiting, necessitating the discontinuance of the drug. Ipecacuanha (5 grains) in powder, with 5 grains of Dover's powder was given to twenty-four patients after emetine had been omitted. Twenty of these patients vomited after each dose, and it was discontinued. Up to 40 c.cm. of antidysenteric serum were given in 15 cases: 2 improved, the result was doubtful in 3, no improvement followed in 8. Fifty per cent. of the cases were treated with emetine and bismuth salicylate (30 grains t.d.s.) and the remaining 50 per cent. with emetine and quinine sulphate (5 grains in tablet t.d.s.). No difference was noted between the two sets of cases. Morphine (¼ grain sublingually) had proved most efficacious for abdominal pain. Tinct. chlorof. et morph. co., combined with bismuth, had been used for acute cases, and tinct. opii (m x), combined with astringents, for chronic cases, but in neither instance with noteworthy effect. Paraffin seemed to prevent the reappearance of streaks of blood in the stools, when used at the stage when the patient passed two or three hard motions in the twenty-four hours. He had been unable to convince himself that irrigations of potassium permanganate, followed in some cases by silver nitrate (30 grains to 3 pints of water), cut short the acute stage of the disease or prevented its chronicity. It soon became noticeable that cases kept on a low diet for a comparatively long period improved more rapidly than those whose food was increased more quickly. Roughly speaking, whole milk was not given till the patient passed only six motions or so a day with very little mucus, and bread-and-butter and eggs were not added till he was passing three or four motions a day with little or no mucus.

Professor S. KARTULIS, after referring to the great prevalence of and high mortality from dysentery in Egypt before the discovery of its causation, spoke of the good results following the irrigation of the large bowel with a 0.5 per cent. solution of tannic acid. He testified to the very great value of emetine, but it often failed and sometimes did not act at all upon the living amoebae in the intestine, even in repeated doses. Perhaps in one-tenth of the cases treated by emetine the amoebae remained alive for a long time. He had not found that quinine injections into the cavities of liver abscesses was satisfactory. Afterwards the amoebae were found dead, but a few days later they appeared again in a living condition. An injection into the abscess of 0.5 per cent. of tannic acid also gave negative results. The same solution injected hypodermically proving also unsatisfactory he tried stronger solutions, and on three occasions used one of 20 per cent. The amoebae after three or four injections disappeared from the pus, and the abscesses soon healed. He had applied similar injections against amoebic dysentery itself, and found that the results were the same as those of emetine; the injections of tannic acid even proved effective when the emetine had failed. It was not always infallible, however. In 1913 he had examined the stools of about 80 cases treated by both methods, and on the whole the results were good. Further progress was made when he combined emetine injections with tannic acid enemata. The latter were constituted according to the formula: Tannic acid 4, iodoform 3, sodium chloride 6, arrowroot 25, aq. destillata 1,000; the mixture to be used in two enemata in the twenty-four hours. Oral medication was necessary to combat such symptoms as arose. His procedure was to inject at once ½ grain of emetine intramuscularly, if possible, twice a day, and to order two enemata in twenty-four hours of this tannic iodoform mixture. The enemata must be kept in the large intestine for fifteen to twenty minutes. He only used purges such as castor oil or calomel in exceptional cases. The injections and enemata must be continued for three or four days. Usually severe symptoms disappeared on the fourth day, the patients becoming free from pain, tenesmus, and frequent motions with blood and mucus; amoebae were not to be found. Afterwards he continued for a week to inject the emetine and to employ the enemata once in every twenty-four hours. Two or three injections of emetine a week were given for another two weeks. For the first three days he permitted only small quantities of diluted milk in weak tea, or, better, slimy soups prepared with fresh butter. Two to four lemon drinks were allowed in the day. On the fourth day he added, once or twice a day, macaroni, rice, or arrowroot, well boiled in water, with fresh butter. Light, solid food was allowed after a week, but only if the stools were normal and free from amoebae. At the same time jams and marmalade might be given. In the early stages, when severe pain was present, he ordered linseed poultices to the abdomen and sometimes injected morphine. For diarrhoea he had used for the last three years, with excellent results, uzara in tabloid or liquid form. Two or three tabloids, or 20 minims of the liquid, should be given every two hours. He had treated by this method about 400 cases with no fatal result. The whole number of cases of amoebic dysentery treated by the old and new methods in the thirty-two years of his practice among private patients was about 3,000. Only four deaths had occurred, and these were treated by the old method.

Lieutenant H. CREAN called attention to the possible value of eusol as an injection into the bowel in certain cases. Eusol was a preparation which more than any other antiseptic was bactericidal without injuring the tissues, and it occurred to him that such a solution should be useful when the acutest stage was over and a secondary infection remained. The solution was made of equal parts of hot saline (2 per cent.) and normal eusol. The solution caused no pain. It had been usually given once a day for four days, and was retained for fifteen to forty-five minutes. Most of the cases reacted well, as shown by the reduction in the number of stools and the subsidence of the irregular fever. He recorded a case in which it appeared that a patient not previously exposed to infection

manifested the symptoms of dysentery forty hours after landing at Alexandria, and in whose stools amoebae were found.

Colonel GORDON HALL said that in the fatal cases which occurred after emetine he could see no evidence that emetine was the cause of death. The men died some days after the emetine had been withheld, and had had less emetine than many others. The death was probably due to post-dysenteric heart failure. Since the introduction of emetine there had been fewer cases of hepatic abscess, and even when this had commenced emetine could cure it. If emetine caused pain he considered that the technique was faulty.

Colonel C. W. HEALY referred to the three cases which had ended fatally from sudden heart failure after emetine had been employed. Two similar cases had been described by Dr. Milton Grendiropoulo. Emetine was a powerful agent whose dosage, and the length of time during which it should be administered, had to be considered carefully. The depressing effects of the drug, if given in 1-grain doses daily for some time, became very marked, the noticeable features being general lassitude, lowness of spirits, disinclination to make an effort, rapidity of pulse, loss of appetite, nausea, and in some cases difficulty in swallowing and a feeling of constriction about the throat and chest. The question of idiosyncrasy and the fact that symptoms of collapse appeared three or four days after the drug had been discontinued had to be considered. There could be little doubt that emetine, if administered continuously, depressed the heart, for the signs of cardiac depression improved quickly when the drug was omitted. Allan found that a 4-grain dose caused nausea. Baermann and Heensmain found that 2 to 2½-grain doses repeated led to weariness and loss of appetite, and that an intermission removed these symptoms. Colonel Healy suggested that the dose should be from ½ to ⅔ grain daily, and that this should be continued until 5 grains had been given. The treatment should then be stopped for seven days, and might then be renewed if not contraindicated until 3 more grains had been given. When under emetine treatment patients should remain in bed, and an accurate record should be kept of the pulse-rate. If this definitely increased, the drug should be omitted until the heart resumed its normal condition. Convalescents who had received emetine should only be allowed up gradually, and should return to bed if the pulse-rate increased considerably. The diet should be fluid—albumin water, whey, milk and barley water or soda water, arrow-root at first thin and gradually thickened, and Benger's food. In severe cases the food should be given every two hours, about 4 oz. at a time, and neither hot nor cold. Milk diet was of the greatest benefit in chronic dysentery. Return to solid food should be made slowly. Fruit must be avoided for a long time.

Major HALL, R.A.M.C.(T.), gave details of the three fatal cases. One case was quite convalescent and had been up and walking for four days. He complained of a sensation in the throat; collapse appeared and death followed nineteen hours later. In neither of the others had there been any cause of alarm. *Post mortem* cardiac degeneration was found in all. The dysenteric ulcers were healed in two and healing in the third. As a routine ½ grain of emetine had been given twice daily for seven days; later, ⅔ grain once daily. Second courses were given because of the continued presence of amoebae, and later still the drug was injected over long periods, with the idea of avoiding liver abscess. The symptoms noted were faintness, lassitude, tremor of muscles, and difficulty of swallowing in 3 or 4 cases and one of the fatal ones. There seemed no reason to suspect any particular variety of the drug. The amounts given in the fatal cases were 21 grains, 12½ grains, and 17 grains respectively. Symptoms arose respectively three, four, and four days after cessation of the drug. In 94 other cases 21 had had over 20 grains of the drug and 14 over 15 grains. In one case 28½ grains had been given. Of the 21 who had had over 20 grains 4 showed signs of cardiac weakness — rapidity of pulse, similarity of the cardiac sounds, and lack of the muscular element in the first sound. None showed "back pressure" symptoms. Emetine was obviously a protoplasmic poison, having a selective action on some forms of protoplasm, like quinine. He suggested that the difficulty in swallowing and sensation about the throat might prove to be due to some change in the medullary nuclei, and advised general rules for the administration of emetine similar to those mentioned by Colonel Healy.

Surgeon-General BABTIE noted with satisfaction the unanimous opinion as to the value of emetine. If given with skill and care its risks became very small.

Notes on the subject were also submitted by Dr. C. EKINS, Lieutenant D. FORDE, and Lieutenant F. DUNN, R.A.M.C.

THE EAST AFRICAN CAMPAIGN.

WE referred last week to some of the more important diseases which prevail in East Africa, and by which unacclimatized soldiers are very likely to be attacked unless they fully understand the nature of the precautions which ought to be taken. We are now able to announce that the Army Medical Department has prepared, for the use of soldiers, a pamphlet, entitled *How to Keep Fit in the African Tropics*, on the insect pests and diseases likely to be met with by an expeditionary force operating in British East Africa. It is a very excellent production, and cannot fail to be of the greatest use in the campaign.

The first part contains some brief geographical notes, and the second gives particulars of the climate of the various regions, which, as is well known, varies extremely, from most unhealthy tropical conditions to those prevailing in the highlands of East Africa, where the climate suits white men excellently. This part contains also a section on heatstroke and sunstroke, in which the irritating effect of even indirect sunlight on the bare skin is noted.

The next part gives a short account of the nature and habits of insect pests and the best methods of dealing with them. Particular attention is, of course, directed to the mosquito, to tsetse flies, and to ticks, but there are useful notes also on lice, and on bed-bugs and flies. As a precaution against lice the use of a powder made of naphthaline, iodoform, and creosote is recommended, which, dusted on the underclothing and rubbed between the seams of the coat and trousers, is said to have a marked preventive effect. One-third of an ounce is stated to be enough to clear the clothing of one soldier, but the treatment must be repeated once a week. "Crude oil emulsion," by which we understand an emulsion of crude petroleum oil with soft soap, is also recommended to be rubbed into the hair and on the insides of stockings, boots, or puttees, on the seams of clothing, and on the neck and wrists. As the proportion of soft soap is considerable it can be used when bathing and for washing clothes. It is also valuable against the bug and for washing furniture. It is added that bed-bugs may be prevented from climbing up by rubbing it on the legs of the bedstead. After a note on the common flea, particular attention is directed to the jigger flea, which lives in the sand of floors or dusty places where natives congregate; originally confined to America and the West Indies, it has spread to Africa and has now reached India. The soldier is recommended if he has an itchy spot on the foot to show it at once to the nearest native servant. "If he nods and says 'jigger' give him a clean needle. The boys are usually very clever at removing the jigger, which is now like a little bag or bladder about the size of a small flea." Tobacco is very poisonous to these insects, and it is recommended to soak the boots and shoes in an infusion of native tobacco now and then.

The next section deals with diseases, including bowel complaints, fevers, and those due to worms.

Under the head of "fever" the first place is given to malaria, and the importance of remembering that most natives in a malarious country, and especially the children, carry the parasite in their blood, is mentioned. The importance of the daily prophylactic dose of quinine is well brought out, but though the value of the mosquito net is mentioned it is not much insisted on, and the soldier may be led to conclude that its use is impracticable. As we pointed out last week, the French and Belgian soldiers have learnt its value, and regard it as an indispensable part of their kit. We are inclined to believe that mosquito

net drill and mosquito net inspection should be matters of routine in all tropical campaigns.

Short notes on dengue and sandfly fever are followed by a longer note on tick fever. While it is true that it is best to prevent the fever by taking means to avoid being bitten by the tick, we do not altogether subscribe to the statement that no cure is known, for salvarsan is as effective in this disease as in syphillis, if not more so. The next section deals with sleeping sickness. Nyasaland sleeping sickness is distinguished as a separate form, due, it is strongly suspected, to *Glossina morsitans*, and it would have been well to have inserted a cross reference to the account of the nagana of animals, since the same insect is one of the flies which most commonly carries it, and its habits differ very much from those of *G. palpalis*, the carrier of the sleeping sickness of East Africa. The statement under the head of sleeping sickness, that lumps in the neck occur after the fever has developed, is too absolute; enlargement of the glands generally develops, but not invariably.

The diseases due to worms mentioned are those produced by ankylostoma, bilharzia, filaria, and guinea-worm. Finally there is a short section on diseases of animals, containing notes on "horse sickness," which also affects mules but not donkeys, due to some parasite as yet unidentified; on nagana, which affects not only horses and mules but also donkeys, oxen, and dogs, due to a trypanosome; and on the East Coast fever of cattle, due to a piroplasm carried by ticks, but chiefly by the common brown tick.

The pamphlet, as we have said, is generally most admirable, and if its recommendations are loyally carried out the effect on the health of the troops ought to be striking; but it must be recognized that while it is important that soldiers of all ranks should understand the dangers and the means of their prevention some of the most important directions can only be taken if the need for them is fully appreciated by general officers, staff officers, and commanding officers, including commandants of small detachments on special duty. For instance, the recommendations that in order to avoid heat-stroke in hot moist climates the men must march light, and not after a heavy meal, are matters entirely within the control of officers. It is a little unfortunate that the direction with regard to wearing coats and shirts open at the neck is ambiguously expressed. It is said that the cause of the condition of heat exhaustion is "want of evaporation from the skin; this is encouraged by moving about with coat and shirt open." It is, of course, the evaporation and not the heat exhaustion that is encouraged by wearing the clothes open. Another point is a recommendation that in malarious countries camps should never be made at the margin of small streams and lakes or pools. This, again, is a matter as to which the rank and file have commonly very little say.

HONOURS.

THE *London Gazette* of January 14th publishes a list of honours conferred on officers and men for services in the war, containing over 3,400 names, and filling three whole pages of the *Times*. The names of the medical officers in the list are given below. The list also contains the names of many non-commissioned officers and men of the R.A.M.C. and members of the military nursing services upon whom distinctions have been conferred.

C.B.

Surgeon-General R. W. Ford, D.S.O.

Colonels.

B. B. Grayfoot (I.M.S.).
J. Maher.
M. J. Sexton.
J. J. Russell.
E. G. Browne.
W. C. Beevor, C.M.G.
H. M. W. Gray (T.F.).
Sir B. E. Dawson, K.C.V.O.
M. W. Russell.

C.M.G.

Colonels.

W. W. Pike, D.S.O.
C. E. Nichol, D.S.O.
B. M. Skinner, M.V.O.
F. Smith, D.S.O.
G. D. Hunter, D.S.O.
J. Atkins (temporary).
W. T. Lister (temporary).
C. A. Young.
S. Macdonald.
G. T. Rawnsley.
C. S. Wallace (temporary).
H. Alexis Thomson (T.F.).
M. MacLaren (C.A.M.C).

Lieutenant-Colonels.

R. Pickard (T.F.).
A. B. Soltau (T.F.).
J. A. Hamilton (I.M.S.).
A. D. Sharp (T.F.)
H. A. Hinge (temp. Colonel).
A. Milne-Thomson (T.F.)
A. W. Hooper, D.S.O.
G. A. Moore.
J. R. McMunn.
C. K. Morgan.
F. Kiddle.
W. H. S. Nickerson, V.C.
F. S. Penny.
J. W. Leake.
F. J. Brackenridge.
A. Chopping.
H. E. M. Douglas, V.C.
L. N. Lloyd, D.S.O.
T. M. Martin (A.A.M.C.).
G. G. Nasmith (C.A.M.C.).
A. E. Ross (C.A.M.C.).
W. H. Parkes (N.Z.A.M.C.).
Temporary Hon. Lieut.-Colonel C. G. Watson, F.R.C.S.

Majors.

W. B. Mackay (T.F.).
H. M. Cruddas (I.M.S.).
W. Riach.
W. W. Jeudwine (I.M.S.).
P. Davidson, D.S.O.

D.S.O.

Majors.

R. B. Ainsworth.
E. B. Booth.
G. H. J. Brown.
J. P. Brown (T.F.).
B. B. Burke.
J. H. Campbell.
R. G. Easton.
P. J. Hanafin.
D. L. Harding.
J. A. Hartigan.
A. E. S. Irvine.
C. L. Kerans (I.M.S.).
N. Low.
A. A. Meaden.
R. A. Needham (I.M.S.).
M. B. H. Ritchie.
F. E. Roberts.
W. F. Roe (T.F.).
J. S. Y. Rogers (T.F.).
E. Ryan.
F. C. Sampson.
A. B. Smallman.
R. J. C. Thompson.
C. H. Turner.

Captains.

J. Downie (T.F.).
J. W. Houston.
W. P. MacArthur.
E. M. O'Neill.
F. Worthington.

Lieutenant J. F. Steven (temporary).

MILITARY CROSS.

Captains.

J. W. Anderson (T.F.).
D. C. G. Ballingall.
H. C. Bazett (S.R.).
F. A. Bearn (S.R.).
E. C. Beddows.
L. G. Bourdillon (temp.).
J. E. M. Boyd.
N. G. Chavasse (T.F.).
A. G. W. Compton (S.R.).
H. S. Cormack (I.M.S.).
R. E. Cree.
C. G. Douglas (temp.).
J. C. A. Dowse (S.R.).
P. G. M. Elvey.
R. Errington (T.F.).
E. A. C. Fazan (T.F.).
J. H. Fletcher (temp.).
W. Foot (temp.).
R. Forgan (S.R.).
A. J. Gilchrist (S.R.).
O. Hairsine (S.R.).
T. Hampson (S.R.).
F. D. G. Howell.
H. R. Knowles (temp.).
S. D. Large.
H. Lightstone (T.F.).
E. F. W. Mackenzie (temp.).
J. MacMillan (T.F.).
J. R. Marrack (temp.).
W. H. L. McCarthy (S.R.).
C. McQueen.
G. Millar (temp.).
S. Miller (S.R.).
T. M. Miller (S.R.).
J. Murdoch (T.F.).
G. E. Neligan (temp.).
R. B. Nicholson (I.M.S.).
J. J. O'Keeffe.
W. C. Paton (I.M.S.).
G. Petit.
R. C. Robertson (temp.).
H. B. Sherlock (S.R.).
T. V. Somerville (temp.).
S. H. Smith.
C. W. Sparks (S.R.).
O. W. D. Steel (T.F.).
E. A. Sutton.
F. T. Turner.
Q. V. B. Wallace (S.R.).
J. R. M. Whigham (temp.).
C. A. Wood (I.M.S.).
T. W. Wylie (S.R.).
R. F. Young.
J. E. Dods (A.A.M.C.).
R. N. Guthrie (N.Z.A.M.C.).

Temporary Lieutenants.

P. Cagney.
J. D. Driberg.
H. C. Godding.
J. T. Kirkland.
R. H. Macgillicuddy.
A. R. Roche.
H. A. Rowell.
A. C. S. Smith.
W. N. Watson.
A. F. Wright.

Assistant Surgeons.

W. J. S. Maine (I.S.M.D.).
E. H. Boilard (I.S.M.D.).

INDIAN ORDER OF MERIT, SECOND CLASS.

Subassistant Surgeons.

Ram Singh (1/4th Gurkhas).
Pargan Singh (6th Jats).

INDIAN DISTINGUISHED SERVICE MEDAL.

I.S.M.D.—Subassistant Surgeons Pohlo Ram (1/9th Gurkhas), Kishan Singh (113th Indian Field Ambulance), Mathura Parshad Sarswit (57th Wilde's Rifles).

SPECIAL PROMOTIONS.

Lieutenant-Colonels to be Brevet-Colonels. — A. J. Macnab (I.M.S.), J. M. Sloan, D.S.O.

Majors to be Brevet-Lieutenant-Colonels.—H. Boulton (I.M.S.), G. Browse (I.M.S.), F. G. FitzGerald.

Captains to be Brevet-Majors.—M. G. Dill, C. N. Draycott (T.F.), C. H. S. Frankau (T.F.), R. G. H. Tate.

Quartermasters and Honorary Lieutenants to be Honorary Captains.—M. Cohen (T.F.), C. H. Cooper, G. W. Harris (T.F.), J. Keogh (T.F.), J. H. Maunder (T.F.), H. C. Okill (T.F.).

OPERATIONS IN GERMAN NEW GUINEA.

On January 11th the Admiralty published an order upon the operations for the reduction of German New Guinea by a force from Australia, sixteen months ago, in the early days of the war. The D.S.O. was conferred upon Lieutenant T. A. Bond, of the Royal Australian Naval Reserve, and fourteen other officers were commended for services in action in the same operations. Among them was Captain Brian Colder Ampill Pockley, of the Australian Army Medical Corps, who, as recorded at the time, was killed in action.

CASUALTIES IN THE MEDICAL SERVICES.

Died of Wounds.

LIEUTENANT WILLIAM WILKIE DEANS, R.A.M.C., was reported in the casualty list published on January 13th as having died of wounds in the Mediterranean. He took the Scottish triple qualification in 1901, and received a temporary commission as Lieutenant in the R.A.M.C. on September 10th, 1914.

Wounded.

Lieutenant-Colonel G. A. Marshall, Australian Army Medical Corps (Dardanelles), May 6th (accidentally omitted at that time).

Lieutenant-Colonel W. Ranson, R.A.M.C.(T.F.), France.

Captain J. A. Sinton, I.M.S., Mesopotamia.

Lieutenant N. S. Joshi, I.M.S., Mesopotamia.

DEATHS AMONG SONS OF MEDICAL MEN.

Murray, J. B., Lieutenant-Commander R.N., third son of the late Dr. W. B. Murray, of Tarbury, Worcestershire, lost in H.M.S. *Natal*, blown up on December 30th.

Scott, A. G., Second Lieutenant 2/3rd Battalion Duke of Wellington's Regiment, elder son of Dr. G. H. Scott, of Sheffield.

NOTES.

THE COLONIAL MEDICAL SERVICES.

IN the article on the Medical Services in 1915, published in the JOURNAL of January 15th, it was inferred that the only colonial medical service which had officially served in the war was the West African medical staff. It should have been added that the East African medical services—those of British East Africa, Uganda, Northern Rhodesia, and Nyasaland—have also been concerned in the war, some of their members having been on service, though fortunately there have been no casualties. It might also be mentioned that the medical staff of General Botha's successful campaign in German South-West Africa consisted of South African medical men. They also, we think, escaped without casualties. But they do not belong to a colonial medical service; these services are employed in the Crown colonies only, not in the self-governing Dominions.

THE VALUE OF ANTITYPHOID INOCULATION.

The Research Defence Society issued a leaflet on protection against typhoid fever about fifteen months ago; it has now added a statement, dated January, 1916, in which it is reported as follows:

Among our Expeditionary Force in France and Belgium about 95 per cent. have been protected against typhoid fever, the annual average being about 90 per cent.

The annual admission ratio per 1,000 is more than nine times greater among the non-protected than among the protected. Among the non-protected it is 9.1 per 1,000. Among the protected it is 1 per 1,000. The death-ratio is thirty-one times greater. Among the non-protected it is 1.84 per 1,000. Among the protected it is 0.06 per 1,000.

The figures for Gallipoli have not yet been thoroughly analysed and criticized; but they leave no room to doubt the value of the protective treatment.

The addendum also deals with the suggestion that the statistics are worthless because typhoid fever and paratyphoid fever are often confused. The leaflet points out that this suggestion is false.

If the cases of paratyphoid fever are added to the cases of typhoid fever, the annual admission among the non-protected is 11.3 per 1,000. Among the protected it is 3 per 1,000. The death ratio among the non-protected is 1.90 per 1,000. Among the protected it is 0.09 per 1,000.

Copies of the leaflet can be obtained free of charge on application to the Honorary Secretary of the Research Defence Society, 21, Ladbroke Square, London, W.

INDIAN SOLDIERS' FUND.

Surgeon-General Sir R. Havelock Charles, G.C.V.O., Sir John Hewett, G.C.S.I., and Mr. C. C. McLeod have gone to Egypt on behalf of the Indian Soldiers' Fund to see what additional comforts and hospital equipment the Fund may properly supply for the benefit of Indian troops in that country. The hospitals for Indian troops at Brighton have been closed, but the Lady Hardinge Hospital at Brockenhurst will be continued for the present. We gave some account of this hospital last March (p. 438). It is well designed and well equipped, and has been admirably administered.

MEDICAL OFFICERS WANTED.

2nd Line Welsh Border Mounted Brigade.

Medical officers willing to serve abroad are required for this brigade. Pay and allowances as in regular army. Promotion to captain after six months' service. Applications to Lieutenant-Colonel D. C. Leyland Orton, S.M.O., 2nd Welsh Border Mounted Brigade, Morpeth.

2/1st South Wales Mounted Brigade.

A regimental medical officer is urgently required for a Yeomanry regiment in this brigade now on the East Coast. Particulars may be obtained from the S.M.O., Head quarters, Yoxford, Suffolk.

England and Wales.

MEDICINE IN SOUTH WALES.

AT a meeting of the Board of Management of the Edward VII Hospital, Cardiff, last week Colonel Bruce Vaughan said that within the last seven years the hospital had received many princely donations, which had enabled it to provide a new wing containing 100 beds at a cost of £50,000, and a fund of £100,000 for their maintenance. The income of the hospital from invested funds during the period had been increased by £10,000 a year, but Colonel Bruce Vaughan accepted these great results as an encouragement to ask for more. The immediate needs of the hospital were, he said, in order of urgency: (1) An extension of the children's hospital; (2) addition of beds for eye cases; (3) the completion of the maternity department; (4) the provision of an orthopaedic department; (5) the provision of beds for male and female tuberculous patients for the purposes of observation and treatment; (6) the provision of extra surgical beds to meet the necessity of the waiting list; (7) an additional operating theatre; (8) the extension of the board-room, with separate rooms for study for the resident medical officers, and a chapel. At present there were 55 beds for children, and he suggested an addition of 25. He mentioned the fact brought out in a recent report by Dr. Newsholme, the medical officer of the Local Government Board, that Wales compared very unfavourably with England in regard to maternal mortality. With the full concurrence of the medical board it was desired to establish and equip maternity and child welfare departments. An orthopaedic department was also badly needed; four years ago something was done in this direction, but a well-organized department was necessary, with at least 14 beds and an operating room. It was desired also, in co-operation with the King Edward Memorial Association, to establish two wards for cases of tuberculosis—one for eight women and the other for ten men—where the cases could be thoroughly studied from the clinical, pathological, and bacteriological standpoints. Research must be undertaken, he said, jointly by the great hospitals and the medical schools, and this rendered all the more urgent the establishment on a proper footing of the Welsh National School of Medicine. The hospital was ready for it and Sir William James Thomas had provided money for complete modern laboratories, but, owing to the action of the Board of Education and the Treasury, the work had been delayed. The reason given was the necessity for reorganizing the University of Wales, but he did not consider that sufficient ground for hanging up a definite and much-needed scheme for the building of the medical school. Permission had been obtained to proceed with the erection of the physiological block, which would be completed early in the next year, but he called upon all men of influence in Wales to take their share in inducing the Treasury to remove its embargo on the establishment of a complete National School of Medicine for Wales. The appeal was supported by the Lord Mayor of Cardiff (Dr. R. J. Smith) and by Dr. Ewen Maclean, who said that the provision of a new maternity department would not only make the institution complete, but would serve the urgent need, day and night, of the whole community. It is announced that in response to the appeal an anonymous

gift of 10,000 guineas had been made, and that Sir William James Thomas has promised to equip the plaster room in the orthopaedic department as soon as it is established.

Scotland.

Queen's Nurses.

The twenty-seventh annual report of the council of the Scottish Branch of the Queen Victoria's Jubilee Institute for Nurses, which provides trained nurses for the sick poor in their own homes, states that the number on the roll is 413. There are 266 nursing associations in affiliation with the Scottish Branch, but the regular work of many districts has only been accomplished with great difficulty, and in some districts has had to be temporarily suspended owing to the fact that 147 nurses are on military duty; 90 are serving at home, 35 in France, Malta, Serbia, the Balkans, and Egypt, and others with Red Cross hospitals.

War and Insanity.

The annual report of Dr. Henry Carre, medical superintendent of the Glasgow District Mental Hospital, Woodilee, Lenzie, shows that the number of patients admitted (436), was greater than last year by 92 (69 males and 23 females). The increase, which is 117 over the average annual admission rate for the past ten years, is to some extent accounted for by the large number of senile cases admitted after Stobhill Hospital was taken over by the military authorities. The transference from Stobhill to Barnhill Hospital of the old people upset many of them so much that they had to be certified and sent to the two asylums under the Board. Dr. Carre states that as far as it is possible to determine there have only been 9 cases (4 males and 5 females) whose mental breakdown could be ascribed to circumstances occasioned by the war. Only one man was actually in the fighting line, one broke down in the excitement of mobilization, and two during military training. In the cases of five women the exciting cause of the mental breakdown was ascribed to anxiety regarding relatives in the fighting line.

The Work of an Absent M.O.H.

On account of the departure of Dr. G. Gray Buchanan, M.O.H. for East Lothian, on war service, Dr. Alexander Robb, Midlothian, has been appointed medical officer for the county *pro tem.*, with Dr. W. R. Martine, Haddington, and Dr. A. S. Miller, Trenant, as deputy medical officers for the western district of the county, and Dr. D. R. Macdonald, Dunbar, for the eastern district.

Correspondence.

THE CAUSE OF THE DIVULSIVE EFFECT OF PROJECTILES.

Sir,—Sir Anthony Bowlby's Bradshaw Lecture, published in your issue of December 25th, 1915, is most interesting and instructive. There is one statement, however, which admits of another explanation. Under the paragraph heading, "General Character of Gunshot Wounds," Sir Anthony says:

> It has been shown that the injury caused by a bullet is largely due to the wave of compressed air which the bullet drives in front of it, and which expands within the tissues.

Can it be that compressed air is the cause of the "divulsive and expanding nature" of these wounds?

Professor Worthington demonstrated by means of photographs[1] every phase of the phenomena of a splash, from that of a drop of water into water to that of a modern projectile perforating modern armour plate.

Between the fluidity of an armour plate and that of water there are innumerable degrees. The human body as a whole represents one of these degrees, its several constituent tissues represent subdivisions of the degree. The ultra-instantaneous method of photography devised by Professor Worthington is necessary to secure permanent records of the splash of a drop of water falling into water, but a projectile striking an armour plate leaves a permanent splash which differs in no essential from the water splash. A wound represents the "splash" caused by a projectile entering the human tissues. Professor Worthington's work appears to supply a perfect explanation of all the effects, both local and remote, which are the result of modern gunshot wounds.

There is the same tendency of the tissues to form "the bubble stage" of the splash. The thickened ring of upraised tissues will follow Plateau's law and break or tend to break into fragments or "drops," explaining the "divulsive effect." The wound must be uneven, as a "rough" splash will be inevitable; a projectile or bullet may be of any size or shape: it may spin, wobble, or trip over itself at any velocity or angle, but the general phenomena at the moment the wound is being made will, considered generally, be the same; any stone thrown into any pond will convince of this—there will be details of "pattern" at the point of entrance of the stone, but the concentric waves will still travel to the confines of the pond. The microscopic appearances found at a distance from a wound compare with the effects of the concentric waves on the surface of the pond, or on an armour plate after a projectile has struck it.

The "concentric effects" of a projectile striking the forearm would not be found in, say, the rectus abdominis, but might conceivably be found in the deltoid of the same side. It would be interesting to know whether the "concentric effects" of a projectile wounding the forearm, when the whole arm is horizontally level with the shoulder, could be found in the deltoid of the opposite limb.

Towards the end of his lecture Sir Anthony instances blows on the abdomen which have produced grave internal injuries without any external wound. Surely not through the agency of compressed air?

Again, is the greater shock experienced when a limb is blown off high up due to the more intense action of the concentric waves because of the closer proximity of the centre of disturbance to the central nervous system?

Professor Worthington's photographs show that air *follows* a projectile, but does not precede it. This following column of air obeys Plateau's law, and breaks into bubbles the moment its length is greater than 3½ times the diameter. This would imply a contracting of the column of air rather than a "divulsive and expanding force." Leaving the effects of sepsis out of consideration, there must be two kinds of sloughing in a wound—one very superficial, caused by the actual contact of the tissues with the projectile, the other deeper and more extensive, caused by the tendency of the thickened rim of the "bubble of the splash" to break into drops, because Plateau's law holds both for columns of air in liquid and for columns of liquid in air. The columns behave in this fashion whether vertically straight or circular and horizontal. If the projectile were perfectly spherical, perfectly smooth, and entered the body exactly at right angles, one would expect to find a ring of fairly even-sized regular tears round or in the wound; but as projectiles are never polished (in Professor Worthington's sense), never spherical, and rarely strike at right angles, the effects will always be different, but the wounds must present the characters associated with an internal explosion. When a stone is thrown into a pond, the drops of water which rise above the surface are not blown up by compressed air carried in either before or after the stone. The column of air dragged in after the stone breaks into bubbles, which rise gently to the surface.

The human body consisting of such different substances as muscle, bone, fat, fascia, nerves, brain, etc., all bound up in a tangled mass, would lead one to expect a very complicated and modified form of splash, just as happens when a stone is thrown into a pond, the surface of which is covered with floating and semi-submerged articles of different size and specific gravity.

The subject is full of interesting speculations, but Sir Anthony's compressed air theory reminds one of that other conjecture as to how many angels can stand on the point of a needle.

I venture to think a perusal of Professor Worthington's work would make the form of modern gunshot wounds more intelligible.

By the way, there is another book will pass an idle hour at the present time—*Commentaries on the Surgery of the*

[1] *A Study of Splashes.* Longmans, Green. 1908.

War, by G. J. Guthrie, F.R.S., etc., President Royal College of Surgeons 1833, 1841, 1854, etc., covering the wars of the period 1808 to 1855. The treatment of wounds by chlorides of lime, soda, and zinc, haemorrhage, sloughing, sepsis, gangrene, and every other accident or illness of the battlefield will be found there, as well as the same old grumbles at the War Office,—I am, etc.,

LIONEL F. WEST, M.R.C.S., L.R.C.P.

Birmingham, Jan. 14th.

SHERBURN HOSPITAL.

SIR,—Dr. Meachen is no doubt right in saying that there is an ancient hospital at Sherburn in Durham, and I accept his assertion that he is the physician-in-charge as conclusive evidence of its existence. I knew of his hospital, which is said by Dugdale to have been founded by Hugo de Puteaco, which I take to be the Latinized form of Hugh Pudsey, Bishop of Durham. It does not follow, however, that there was no leper house at Shireburn in Yorkshire, and Dr. Meachen admits that there was a hospital there, though he says it was not a leper house. He accuses me of spelling the name wrong, and says that my Shireburn in Yorkshire ought to have been Sherburn in Durham; but in the seventeenth century, when Dugdale wrote, people spelt according to their own fancy, and acknowledged no obligation to spell the same name always in the same way; and sometimes one, sometimes another, of these variants has been accepted and adopted. The place now called Sherborne in this county of Dorset was spelt by Dugdale Shireburne. I think, therefore, we may conclude that, while Dr. Meachen is right, I am not wrong; in fact, he is right, and I am right, and all is right as right can be.

Allow me in conclusion to thank you for your very handsome and interesting review of my lectures.—I am, etc.,

Parkstone, Dorset, Jan. 15th. CHAS. A. MERCIER.

THE TONSILS.

SIR,—In the correspondence under this title it is accepted that, when there is any question of removing the tonsils, these glands should be removed *in toto*. The two points which are giving rise to discussion appear to be the following: (1) Is there any risk in carrying out complete enucleation of the tonsils in singers? (2) Should this enucleation be carried out by dissection or with the guillotine?

I have never had any complaint from a singer after this operation, for the very good reason that I have never ventured to perform it on a trained artist. With students of singing—those who are just "learning to sing," and in whom the operation is indicated—I have never seen any but satisfactory results, the improvement and development of the voice being sometimes very noticeable. But many other observers have had experiences which should put us on guard. Hudson Makuen thinks it is safer, in the case of singers, to leave the tonsil capsule, and possibly some portions of the tonsil.[1] Bryan D. Sheedy examined a series of one hundred throats, three to ten months after operation by the modern method of enucleation; about 5 per cent. of the patients complained of difficulty in using certain words, and had nasal intonation six months after operation. Four of the whole number had practically lost their singing voice.[2] It is, to say the least, unwise for any one with the necessarily limited experience of his individual practice with this operation amongst professional singers to stigmatize this possible risk as a "popular fallacy."

As to the method of operating: Enucleation of the tonsils by dissection, as I have seen it carried out by its chief exponent, is a neat and thorough operation, leaving the throat in a satisfactory condition. As evidence that I have no prejudice against it, I may point out that as long ago as 1901 I called attention to the inadequacy of the guillotine in certain cases of submerged and adherent tonsils, and recommended in such instances removal by dissection.[3] Later on I learnt to use the guillotine to effect excision of the tonsil with its capsule by using a tractor to draw both gland and capsule well through the ring of the guillotine. Specimens illustrating the completeness of this method were shown before the meeting of the British Medical Association in London in 1910, and are figured in my textbook. About the same time, as Dr. W. Hill has pointed out, Whillis and Pybus in this country and Sluder in America demonstrated that, instead of using traction, the tonsil and its entire capsule could be impressed through the guillotine ring by manipulation with the forefinger or by crowding the mass against the alveolar eminence of the lower jaw. No special "tonsillectomy guillotine" is required for this, as Dr. Syme appears to think. In my own clinic all tonsils are enucleated with the form of guillotine which was slightly modified by Mr. Charles Heath at the Throat Hospital more than twelve years ago. Until he left for the front, these enucleations at King's College Hospital were carried out rapidly, completely, and safely by my colleague, Mr. C. W. M. Hope, who formerly practised and advocated the dissection method. Many others have likewise discarded the method of dissection since learning that an equally good, if not better, operation can be executed with the guillotine. It is the method which is employed in many throat clinics in London and largely in America.

The correspondence columns are not the best place for studying and comparing the advantages and drawbacks of the two methods of enucleation. This can be done much better in our operating theatres and by demonstrations of patients and specimens before our medical societies. It is sufficient here to protest against Dr. W. S. Syme's statement, in regard to the removal of the tonsil complete in its capsule, that "to do this in every case some method of dissection is necessary." Enucleation of the tonsils by dissection is certainly not the only way. It has still to be shown that it is the safer, speedier, easier, or better way.—I am, etc.,

London, W., Jan. 17th. STCLAIR THOMSON.

SIR,—All who have contributed to the discussion in your columns regarding the surgery of the tonsil are agreed as to the superiority of enucleation over the older methods, but there is some difference of opinion as to the technique of the operation. The following guiding principles may, therefore, be worthy of consideration. (1) In children the procedure introduced by Whillis and Pybus, that is, enucleation by means of the reversed guillotine, or, as I prefer to call it, the "new guillotine operation," gives uniformly good results. (2) In adults, and especially in those who have suffered from quinsy, firm adhesions bind the tonsil to its bed and render the above operation impossible. The ideal method for such cases consists in dissection with scissors and snare under local anaesthesia.—I am, etc.,

DOUGLAS GUTHRIE,
Edinburgh, Jan. 18th. Lieutenant, R.A.M.C.

*** We cannot continue this correspondence.

[1] *Trans. American Laryngol. Assoc.*, xxxiii, 1911, p. 222.
[2] *Trans. Amer. Med. Assoc.*, Section of Laryngology, lxiv, 1913, p. 180.
[3] *Trans. Medical Society*, London, xxiv, 1901, p. 302.

Universities and Colleges.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A QUARTERLY Council was held on January 13th, when Sir W. Watson Cheyne, President, was in the chair.

Earlier Closure of the Library.

The Library will be closed at 6.30 p.m., instead of at 7 p.m., during the next three months. The Common Room will be closed during the war.

Contribution to British Red Cross Fund.

The Council recommended that the College should contribute 50 guineas to the funds of the Joint Committee of the British Red Cross Society and the Order of St. John.

Court of Examiners.

Mr. H. J. Waring was re-elected to the Court of Examiners.

Removal of a Member.

A member's name was removed, and a notice to this effect be sent to the Registrar of the General Medical Council.

Hunterian Oration for 1917.

Sir George Henry Makins was appointed to deliver the Oration for 1917.

Obituary.

HERBERT WILLIAMS, M.D.Lond.,

M.O.H. PORT OF LONDON.

We regret to have to record the death, on January 16th, at the age of 53, of Dr. Herbert Williams, M.O.H. for the Port of London. He had recently been operated upon for appendicitis, and death was due to cardiac failure. He was the son of the late Alderman T. H. Williams of Weymouth, and received his medical education at St. Bartholomew's Hospital. He graduated M.B.Lond. with honours in medicine and physiology in 1888, and M.D. in 1890. He acted as assistant house-surgeon to the Metropolitan Hospital and house-physician to St. Bartholomew's. He was appointed assistant port medical officer (London) in 1892. In the following year he took the degree of M.D.Lond. in State Medicine and also the D.P.H. of Cambridge. In 1901 he succeeded Dr. W. H. Collingridge (who had been appointed medical officer to the City of London) as medical officer of health for the Port of London. The area under the jurisdiction of the Port of London Sanitary Committee extends from the high-water mark at Teddington Lock to Warden Point in the Isle of Sheppey, and includes the lower part of the Medway and innumerable streams, creeks, and harbours. One of the matters with which Dr. Williams had to deal was the possible danger of the introduction of plague, and it is stated that even to day the averate number of rats killed every year is about 50,000. Among the duties to be discharged by the department over which Dr. Williams presided with so much ability, in addition to the inspection of ships for the prevention of exotic diseases, are the inspection of imported meat and foods generally, and of shellfish layings in the Thames estuary. He was also medical inspector under the Aliens Act and lecturer on port hygiene in the London School of Tropical Medicine. Dr. Williams was adjutant of the 1st Kent Royal Garrison Artillery Volunteers during the South African war, and afterwards held the rank of major in the corps. He was a man much given to outdoor sports, and was a good golfer and oarsman.

A life-long friend writes: By the death of Dr. Herbert Williams the profession has lost one of its most able experts in public health, and it is no exaggeration to say that the ability, tact, and energy he displayed during the fifteen years for which he occupied the important position of medical officer to the Port of London have rarely been excelled. Perhaps more than all others the Port of London involves powerful interests, many of which are more or less in conflict; but Herbert Williams possessed in such a high degree the qualities of firmness, tact, and a strong sense of justice, that he was generally able to carry out the sanitary regulations of the port to the satisfaction of all. The importance of his work as medical officer to the Port of London will be understood when it is stated that on him rested the duty of inspecting and passing, as fit for consumption, all the food brought to London by ships, in addition to that of preventing the ingress of contagious disease. Williams had a deep practical acquaintance with port conditions, combined with medical ability and a shrewd knowledge of mankind, and those who knew of these qualities were perfectly satisfied that the sanitary welfare of the great city was in safe and capable hands. Except to the few experts, his great work at the Port of London was almost unknown, for Herbert Williams had a contempt for self-advertisement. He knew his own worth, but was careless as to whether those outside the great Corporation he served were acquainted with his abilities. Those who knew him intimately will sadly miss his cheery personality, his capacity for forming firm friendships, and his high feeling for justice and right.

CHARLES HENRY FOX, M.D., F.R.C.P.E., M.R.C.S.,

FORMERLY OF BRISLINGTON HOUSE ASYLUM, BRISTOL.

We record with regret the death of Dr. Charles Henry Fox, who died, aged 78, on Christmas Day at his residence in Edinburgh, to which he had retired after relinquishing practice at Brislington House, near Bristol. He was the fourth son of the late Dr. Francis Ker Fox of Brislington Asylum, and a brother of the late Dr. Edward Long Fox of Bristol, and was born on June 7th, 1837.

Charles Henry Fox was educated at Shrewsbury and Highgate College, and entered at St. George's Hospital in 1855. He took the diploma of M.R.C.S. in 1859, and, after a further year at Edinburgh Medical School, he graduated M.D. at St. Andrews. He joined his father at Brislington House Asylum, and became a partner in 1873. He remained there until 1894, at first with his father and afterwards with his half-brother, Dr. Bonville Bradley Fox. When he relinquished practice he retired to Edinburgh, where he had many friends and old associations that he valued highly. He became a Fellow of the Royal College of Physicians of Edinburgh in 1900, and also a Fellow of the Botanical Society, and of the Society of Antiquarians of Scotland. He always described his earlier life in Edinburgh as his happiest year, and never regretted his return to that city to spend the last twenty-one years there, though for the last twelve years he had suffered from ill health, and had been a complete invalid for several years before he died. Ever courteous, kindly, and of a most generous and lovable disposition, he leaves behind him many relatives and friends who mourn his loss.

THE LATE COLONEL E. O. WIGHT, R.A.M.C.—A correspondent who was present sends us the following tribute to the memory of a dead comrade which was addressed to his officers by Colonel H. N. Thompson, D.S.O., at a recent fortnightly conference of the medical officers of an army corps serving in Belgium:

Brother officers, I ask you to rise while I remind you that this is our first meeting here since the passing of our brother Colonel E. O. Wight. I have no doubt that his striking personality and genial presence is vividly with you all at this moment, as it is with me. He was ever a loyal colleague and wise organizer and adviser. He possessed such wonderful energy that he had always been everywhere and seen everything throughout the division, and only spoke of what he knew. To those of you who had the great privilege of serving under him in the 49th Division he was the ideal chief, and I well know how he had won the affectionate respect—I may almost say reverence—of every one of you. Colonel White was proverbial in the corps as being a man devoid of fear, one devoted heart and soul to his work, and to the interest and care of the soldiers committed to his charge. He was an officer of the very best type which our corps produces, a conscientious worker, a good sportsman, and a gentleman to his finger tips. It was inconceivable that anything sordid or mean could ever find a place near him. In his career he set a bright example, and taught us how best a man should live, and, finally, how he best should die. I think his was the death which he would have most wished to die. Killed on the field of honour in the cause of his country and his King, the death most fitting such a gallant gentleman. *Requiescat in pace.*

We regret to have to announce the death last week of Dr. EDWARD DANIEL O'NEILL, Resident Medical Superintendent of Limerick District Lunatic Asylum, after an illness which did not take an acute form until within a few days of his death. He was born sixty-three years ago. He was a student of the Carmichael School, Dublin; he took the diplomas of L.R.C.S. (1872), L.R.C.P. (1878), and M.R.C.P.I. (1884), and from 1881 to 1886 he was assistant medical superintendent at Richmond Lunatic Asylum, whence he was promoted to be resident medical superintendent of Castlebar Asylum, where he did duty for a period of four years. In 1890 he succeeded to the charge of Limerick Asylum, and during his long tenure of that office won the recognition of the inspectors, the committee of management, and the public for his thoughtful and capable administration and the kindness he showed towards the patients under his care. His death is greatly regretted, and the committee of management at its last meeting passed a vote of condolence with his family.

DR. HENRY LAWRENCE, who died at Capetown on July 20th, at the age of 86, was the oldest member of the profession in South Africa. He was present at the first administration of chloroform in London, at University College, during an operation performed by Liston. He was born in England. He began his professional education as apprentice to a practitioner in a western county. In October, 1847, he entered at University College; he took the diplomas of M.R.C.S. and L.S.A. in 1850, and for three

years practised in London; he went to South Africa in 1854, and received an appointment in the Convict Department then mainly engaged in road making. Subsequently he practised for many years at George. He retired in 1880, and lived afterwards at Capetown. All Dr. Lawrence's four sons entered the medical profession. Dr. T. G. Lawrence, first in practice in George, went to Johannesburg in its early days and died in the Eighties. The remaining sons, Drs. Alfred, Norman (Major R.A.M.C.), and Arthur Lawrence, are still in the Cape Province. Two of Dr. Lawrence's grandsons are doctors—Dr. Ruthven Lawrence of Claremont, at present serving with the South African General Hospital in England, and Dr. Cyril Wilson, late Surgeon, R.N., more recently in practice in South Africa, and now serving with the Royal Army Medical Corps. The *South African Medical Record* describes Dr. Lawrence as a man of fine presence, who until lately retained all his vigour; only three years ago he underwent suprapubic lithotomy, and walked about, as though nothing had happened, within a fortnight. Dr. Lawrence was well read, as he never neglected general learning. His social qualities were high, and he charmed his friends by his conversational powers.

THE HON. WALTER HUMPHRIES MONTAGUE, M.D., of Winnipeg, died of apoplexy on November 15th. He was born at Adelaide, Ontario, in November, 1858, and was the son of a farmer. His career was remarkable; he began as an errand boy in a country store. He took a teacher's certificate at Woodstock College, and afterwards entered the Toronto School of Medicine, going from there to Victoria University, Cobourg, where he obtained his degree. He was admitted to the College of Surgeons and Physicians of Ontario, and to the Royal College of Physicians of Edinburgh. For several years Dr. Montague practised at Dunnville, Ontario. In 1883 he was an unsuccessful candidate for the Ontario legislature, and was first elected to the House of Commons in 1887. The election was voided, but he was re-elected the same year; that election was also voided by the Supreme Court of Canada. In 1889 he was an unsuccessful candidate at a by-election, which also was declared void, and in 1890 he was again elected. He was re-elected in 1891 and 1896, but was defeated in 1900. In December, 1894, Dr. Montague entered the Bowell administration without portfolio, and in 1895 became Minister of Agriculture, which office he retained under the Tupper Government until July, 1896. In 1908 Dr. Montague removed to Manitoba, and in 1913 was appointed Minister of Public Works. He retained that office until the resignation of the Roblin Government some months ago. Dr. Montague leaves a widow, two daughters, and two sons—Captain R. J. Montague, who is Staff Captain for General Ketchen, and Captain F. Montague, A.D.C. to General Turner.

The Services.

EXCHANGES DESIRED.

A CAPTAIN R.A.M.C.(T.F.) Field Ambulance, at present in England, wishes to exchange with an officer doing duty in a hospital or casualty clearing station. Address No. 350, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C

Captain (T.F.), at present serving in Mounted Brigade Field Ambulance at home, wishes to exchange with officer in Field Ambulance or Casualty Clearing Station abroad or about to proceed abroad.—Address, No. 349, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

THE late Dr. J. W. N. Mackay, of Elgin, left personal estate of the total value of £13,269.

THE Police Commissioner of New York has taken action for the prevention of unnecessary noises, and has issued an order enjoining a strict enforcement of the regulations.

UNDER the presidency of Professor Sanarelli a national league for the hygienic well-being of soldiers in the field has been formed at Rome. Its object is to supply whatever is needed to make life in the trenches and fighting line generally more comfortable for the men, to improve their physical condition, and increase their power of resistance to disease. Branches of the league will be formed in different cities for the special purpose of arranging for the transmission of gifts for the troops.

Medical News.

THE *Journal de Médecine de Bordeaux* states that at the opening of the academic year 1914–15 there were still some students too young for military service, but the successive calling up of the 1915 and 1916 classes quickly thinned their already depleted ranks. At present Saint André, the principal clinical hospital, has only two residents; both are doctors of medicine, and one is a woman. Eleven externs are doing duty as residents. The other hospital workers (*stagiaires*) comprise a few young men medically unfit for military service with some women students and a sprinkling of foreigners. In the early months of the war there was a marked decrease in the number of ordinary patients. The total number for the third quarter of 1914 was 1,351. In 1915 the figures became almost normal; the number of patients in the third quarter was 1,883, higher by 532 than that for the corresponding period in 1914. A noteworthy point is the change in the nationality of the patients. Whereas before the war the wards were filled with Portuguese, Greeks, Dutchmen, Danes, and Norwegians, lying side by side with Moroccans come to Bordeaux to work on the quays, now their place has been taken by French men and women and by Belgian refugees. The scheme for uniting the four teaching hospitals—Saint André, the Children's Hospital, that of Le Tondu and the Pellegrin Hospice—into one vast general hospital, which was on the point of being carried into effect, has had to be held in abeyance till the end of the war.

IN some notes on insecticides published in the *Journal of Tropical Medicine and Hygiene*, Drs. Castellani and Jackson state that for use against lice on a large scale the best powder is naphthaline. It has a lower destructive action than kerosene oil, guaiacol, iodoform, or anise preparations, but has a less unpleasant odour than the first three named, and is much cheaper than the last. Of liquid insecticides kerosene appears to be the best. Where price is not a matter of consequence menthol powder is to be preferred to naphthaline; it not only repels lice and fleas, but mosquitos also. For bugs kerosene oil is the best insecticide, and next to it guaiacol and pyrethrum powder.

LAST February the *Field* published a very remarkable special supplement, written by Dr. Arthur Tacquin, Physician-in-Ordinary to the King of the Belgians, giving an account, with striking illustrations, of some of the deeds of the Germans in Belgium. The editor of the *Field* now announces that a special shilling number of that paper will be published on January 29th, giving a further account of the crimes of the Germany army. Among other matters it will deal with the murder of women and children, and the murder and wounding of civilians in France, with corroborative evidence from German sources; the use of civilians as screens, with German admissions that this had been done; and with the killing or mutilating of wounded, again with German admissions. The long preliminary table of contents, of which we have given only a brief outline, includes also outrages on the Red Cross and the poisoning of wells, and ends with the significant words, "more to follow."

THE China Inland Mission has issued a report by Dr. G. Whitfield Guinness (London: Morgan and Scott. 1915. Price 3d. net), of the medical work done in Kaifeng, the capital of Honan, under its auspices. The death (from typhus fever contracted in the course of his work) of Dr. Sidney Carr in 1914 made the running of the hospital there very difficult, but Dr. Guinness has since been joined by Drs. Jessie McDonald and D. M. Gibson. Medical training is carried on, and although Kaifeng Mission Hospital is not a medical school with power to grant a doctor's degree, the curriculum is a practical one and turns out men who are able to do a large number of operations with skill. These hospital assistants are divided into three classes: Student assistants, ward nurses, and ward coolies. The women's work is now under the charge of Dr. Jessie McDonald, who is a graduate of Toronto. In 1904, when the work was begun, there were 1,476 out-patients' attendances; in 1913 the number had risen to 15,021, and there had been a further increase in 1914. The number of in-patients in 1913 was over 600; and the 1,600 operations included 505 for entropion, 175 for fistula in ano, 372 for various abscesses, 157 tooth extractions, and a few serious operative procedures. Local anaesthesia was used in 950 cases, no anaesthetic at all in 567, and chloroform in 133

Letters, Notes, and Answers.

Correspondents who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

Authors desiring reprints of their articles published in the British Medical Journal are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

The telegraphic addresses of the British Medical Association and Journal are: (1) EDITOR of the British Medical Journal, *Aitiology, Westrand, London;* telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* British Medical Journal *are devoted will be found under their respective headings.*

QUERIES.

Income Tax.

"Tax" has been assessed in respect of a temporary War Office appointment at the full—that is, unearned—rate of income tax, and inquires whether there is any right of appeal.

*** We presume that "Tax" refers to the year of assessment ending April next. The Finance (No. 2) Act, 1915, Sec. 29, abolishes the time limit for claiming the earned income relief, and though the date of the Act (December 23rd, 1915) is probably subsequent to the assessment, the Act refers to the whole of the taxation for the year 1915–16, and we think that the section quoted would enable our correspondent to lodge a claim to the relief now. He should communicate with the assessor or the surveyor of taxes, quoting the reference given above, and filing—if he has not already done so—a statement of his total income for the year. If the relief is still refused, he might be well advised to write to the Board of Inland Revenue, Somerset House, W.C.

"Temporary Officer" inquires whether allowances from which the ordinary income tax has been deducted in the usual way are liable to super tax.

*** According to Section 66 (2) of the Finance (1909–10) Act, 1910, the "income" for purposes of super tax is to be "estimated in the same manner as the total income from all sources is estimated for the purposes of . . . abatements under the Income Tax Acts." It follows from this that income liable to income tax is also liable to super tax, but in the latter case the liability is in respect of the following year.

T. inquires as to the basis of calculation of (1) the statutory abatement, and (2) the allowance for cost of motor car, etc.

*** The amount of the abatement depends on the *total* taxable income. On the figures quoted, "T.'s" total income appears to be £400 earned *plus* £120 private income—that is, £520—and the abatement appropriate to the total is £100 on the new scale. With regard to the motor allowance, it has to be remembered that the cost of the original car or cycle represents capital outlay, and that it is only the expense of repairs, etc., and the ultimately inevitable "replacement" that are allowable. Apparently, no allowance is due in respect of the motor cycle, as no replacement cost has yet been incurred; on the other hand, an allowance is due for the renewal of the car, and it is understood that the amount due is taken by the officials concerned at the *net* cost of the original car—that is, £300, less £88 10s. allowed on purchase of the new car—provided that that sum is not less than the cost of the new car. It is, of course, assumed that no deduction has been made in the past by way of estimated depreciation allowance.

Herpes of the Penis.

A correspondent in the Far East reports an inveterate case of simple herpes localized to the right side of the body of the penis, which heals but recurs on the slightest irritation. Local applications, ionization, and drugs are without permanent benefit. Our correspondent asks if division, section, or stretching of the nerve supplying the affected part would be of service as similar treatment has proved efficacious in old-standing cases affecting the supraorbital region (Malcolm Morris, *Diseases of the Skin*, 5th ed., p. 179).

*** This case is apparently, as our correspondent implies, an instance of neuralgic herpes which not only affects the seat of eruption but is also felt along the nerves which supply the affected region. It is a form of zona or herpes zoster, distinct from herpes of external origin (Gaucher and Marshall). Head and Campbell, who have enjoyed exceptional opportunities of investigating cases of herpes zoster in which death occurred from other causes, found that in common "shingles" there was always evidence of some lesion in a posterior spinal ganglion, while in instances in which the eruption appeared in the head the Gasserian or geniculate ganglia were involved. The lesion was usually a haemorrhage, but cancer and injury have also been noted (Norman Walker, *Introduction to Dermatology*). As these lesions lie so high up it is questionable if division of the involved nerve would effect a cure, and since, as our correspondent notes, branches of the ilio-inguinal nerve, as well as the dorsal nerve of the penis, are distributed over that organ, it would not be easy to determine in this case which nerve was at fault. The cause is certainly obscure. Norman Walker notes that prolonged dosing with arsenic predisposes patients to zona, as was proved in a celebrated beer-poisoning epidemic. Perhaps our correspondent's patient may, unawares, have taken food containing some poisonous element.

High Heels and Flat-Foot.

"Pes" asks for information or reference as to the effect of high-heeled boots or shoes in flat-foot. He thinks it difficult to defend the use of heels raised even moderately except on the ground of long-continued custom; but adds that although for a normal foot a boot with a high heel stands condemned under ordinary conditions, yet it is of course conceivable that it may be of service in the case of a foot already flat, or in one likely to be subjected to conditions favourable for the development of flat-foot. The mechanico-physical forces coming into action when the human body is in a state of balance in the upright position or during locomotion, or when the foot is turned in or turned out, as in "pigeon-toe" or "splay-foot," appear, he thinks, to be intricate.

ANSWERS.

A. R. B.—There are many excellent books on the subject, and our correspondent is recommended to consult the dean of his medical school.

Petrol Duty.

Lt.-Col., R.A.M.C.—The allowance for petrol duty is made by way of repayment or "rebate," and amounts to one-half of the duty. It is restricted to motor spirit used for a motor car kept by a duly qualified medical practitioner (and now also veterinary surgeon) "while it is being used by him for the purposes of his profession." The evident intention is to relieve the medical and veterinary professions as such, and if the uses to which our correspondent puts his car are not substantially different from those to which other non-medical military officers put their cars, we fear he may find considerable difficulty in making good the claim either to the motor spirit rebate or to the similar allowance of licence duty.

The Luetin Test.

Major V. E. H. Gatt will find a description of the technique and results of the luetin test in the following works: Noguchi's *Serum Diagnosis of Syphilis*, third edition (J. B. Lippincott Co., London, 1912, price 12s. 6d. net). Marshall's *Syphilology and Venereal Disease*, third edition (London: Baillière, Tindall, and Cox, 1914, price 10s. 6d.). McDonagh's *Biology and Treatment of Venereal Diseases* (London: Harrison and Sons, 1915, price 25s.). Noguchi's original articles are in the *American Journal of Experimental Medicine*, 1909 and 1911. So far as we know, luetin is not on the English market, but it might be obtained from Dr. Noguchi at the Rockefeller Institute for Medical Research, New York.

LETTERS, NOTES, ETC.

Paraffin in Dysentery.

A Correspondent writes: I have advised, I need not say in an entirely friendly way, the use of refined paraffin in some cases of acquaintances returned home from Gallipoli suffering from dysentery and slowly convalescent. I prescribed a tablespoonful or less at bedtime in hot water or hot milk, and the results were extremely good.

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